

AD 654181

LIFE CYCLE COSTING IN EQUIPMENT PROCUREMENT

SUPPLEMENTAL REPORT

TASK 66-3

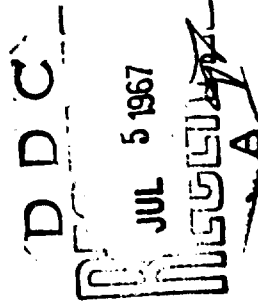
FEBRUARY 1967

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SUPPLEMENTAL REPORT

TASK 66-3

FEBRUARY 1967

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FOREWORD

Personnel in the Office of the Secretary of Defense and the Military Departments have worked diligently since July 1965 in a joint and formal test of Life Cycle Costing in actual procurements. The Logistics Management Institute has served as consultant and technical advisor. This report, based on that test program, is therefore not merely a report on an LMI study. Its principal contributors are the many dedicated Government personnel who have been willing to depart from traditional practice and undertake to solve the difficult practical problems impeding implementation of a potentially valuable concept. Their efforts have been facilitated by representatives of defense contractors and industry associations, who have endorsed the test program and presented useful suggestions.

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34. Where does the most rapid payoff seem to lie in implementation of Life Cycle Costing?
35. How does the Life Cycle Costing concept work in actual practice?



" AWARD SHALL BE

MADE ... TO THE RESPONSIBLE

BIDDER WHOSE BID ... WILL BE MOST

ADVANTAGEOUS TO THE UNITED STATES .

PRICE AND OTHER FACTORS CONSIDERED."

SECTION 2305(c), TITLE 10 USC

LIFE CYCLE COSTING IN EQUIPMENT PROCUREMENT
SUPPLEMENTAL REPORT

Background

In its report on the Armed Services Procurement Act of 1947, the Senate Committee on Armed Services addressed itself to "the present traditional approach that Government contracts must be awarded primarily on the lowest-price basis, irrespective of the best public interest or of lower ultimate cost."¹ The Act stated that "Award shall be made . . . to the responsible bidder whose bid . . . will be most advantageous to the United States, price and other factors considered." (Underlining supplied.) Nevertheless, award of contracts on the basis of price alone continued to be the predominant practice by an overwhelming proportion.

DoD management became increasingly concerned over the military, technical, and economic consequences of such practice. In late 1963 the Assistant Secretary of Defense (Installations and Logistics) directed special attention to the economic consequences. He assigned LMI the task of studying the effect that price competition, with its potential for changing supplies, may have on life cycle equipment costs. In order to keep the ensuing study within manageable limits, and because other investigations were being directed at procurements of

¹ 80th Congress, First Session, Senate Report Number 571, "Justification of the Bill," 16 July 1947.

systems and major subsystems, effort was restricted to procurements of parts, subassemblies, assemblies, and minor subsystems. Study effort was also restricted to production contracts; i.e., research and development contracts were not considered.

The final report, "Life Cycle Costing in Equipment Procurement," was issued in April 1965. This document is a supplement to that report and assumes familiarity with it.

The 1965 report focused on "logistics costs," defined to include costs of corrective and preventive maintenance; inventory management; training, both maintenance and operational; inspection, installation, and checkout; transportation; documentation; and certain costs of operation. It observed that logistics costs as well as purchase price can vary significantly among bidders' products and presented an approach for including logistics costs in competitive contract award criteria.¹ Primary conclusions presented were that techniques are either available or capable of development for predicting and measuring logistics costs within tolerances which should permit their use in bid evaluation, and that the utility and economic feasibility of those techniques should be tested in actual competitive procurements.

¹In this report, as in the April 1965 report, the words "bids" and "bidders," in addition to taking on their customary meanings, are used for editorial convenience to mean proposals and those who submit proposals.

The existence of problems impeding Life Cycle Costing application was acknowledged. Key problems discussed were the absence within DoD of adequate cost accounting systems for collecting costs useful in logistics cost analyses, difficulties in obtaining design information from bidders, the tendency within military agencies to isolate technical and procurement personnel from one another through compartmentalization of functional responsibilities, and the cost of making logistics cost analyses. The conclusion was, however, that none of those problems appeared to be insurmountable, and that any assessment of logistics costs, no matter how limited, is to be preferred to the alternative; viz., a complete disregard for the impact of procurement decisions on such costs.

The approach set forth divided the Procurement Decision Process into two parts, called "Mode 1" and "Mode 2." It has since been found advantageous to give those parts more descriptive names: the "Procurement Method Decision Process" and the "Contract Award Decision Process," respectively.

PROCUREMENT DECISION PROCESS	
PROCUREMENT METHOD DECISION (Formerly Mode 1)	CONTRACT AWARD DECISION (Formerly Mode 2)

The purpose of the Procurement Method Decision Process is to establish whether a given procurement should be negotiated with a single source, competitive

with the award based on purchase price, or competitive with the award based on price plus certain logistics costs. The process takes the form of a screening procedure, utilizing expert opinion as well as available data, to arrive at a verdict readily and inexpensively. It establishes not only whether logistics costs should be included in the contract award criteria, but also which logistics costs should be included.

The Contract Award Decision Process, in the case of a competitive procurement, involves preparation of an Invitation for Bids (IFB) or Request for Proposals (RFP) which contains explicit statement of all contract award criteria. It also involves the actual choice of contractor in strict compliance with those criteria.

Two recommendations were presented in the 1965 report:

1. The practicability of evaluating logistics costs in procurement should be tested in actual procurements of non-commercial repairable equipments and the guidelines outlined (in that report) should be used in conducting such tests.
2. Award of contracts for nonrepairable equipments on the basis of lowest price per unit of service life (e.g., mile, operating hour, calendar month) should be tested in actual procurements in which service life in excess of the minimum required is useful.

Government Action

On 10 July 1965 the Assistant Secretary of Defense (Installations and Logistics) issued a memorandum to the Assistant Secretaries (I&L) of the Military Departments. The first two paragraphs of that memorandum are as follows:

It is important that we develop an improved capability to identify and evaluate logistics costs, other than price, in awarding contracts for equipments. Constructive work has been going on in the Departments for some time to achieve this objective. The IMI Report in April 1965 entitled Life Cycle Costing in Equipment Procurement includes suggestions and recommendations which we believe will enhance this effort. This report has been distributed throughout the Military Departments. There is general agreement that a well organized approach should be undertaken, particularly to ensure communication of information and experience between the organizational elements in the Departments engaged in this work. Coordination with industry is desirable especially to familiarize defense contractors with the general concept and our intention to develop procedures to exploit it. As you know, many defense contractors have urged from time to time that logistics costs, other than price, should be taken into consideration in awarding contracts. Undoubtedly, coordination with industry will be of material assistance in our developing procedures to implement the concept.

It is proposed that a Steering Group shall be established composed of representatives of my office, including the Director for Procurement Management who will be chairman of the group, and at least one representative from each Military Department. Additionally, each Department will establish Life Cycle Costing Task Groups including, but not limited to, personnel representing Procurement, Engineering, Maintenance, Supply and Training. These will be responsible for determining whether adequate data can be secured or developed to make reasonably satisfactory logistics cost

analyses during the evaluation of proposals leading to procurements of repairable equipments and the feasibility of including service life as one of the factors in evaluating proposals for procurements of nonrepairable equipments. These data will be tested on actual procurements generally along the lines recommended in the LMI report. It is expected that exactly the same procedures will not be employed in all Departments or in every procurement tested. In order to ensure the most effective coordination of the entire effort, the Steering Group should be kept fully informed, by written reports or otherwise as it may determine necessary, of all the procedures employed.

The Assistant Secretaries (I&L) of the Military Departments named representatives to the DoD Life Cycle Costing Steering Group and organized teams to select, plan, and monitor procurements testing the Life Cycle Cost approach. The Army established a Task Group with representatives from its Commands and Centers, and subsequently developed a list of items to be procured on a Life Cycle Cost basis. The Navy set up a Steering Group to guide and evaluate its test experience, and established a Test Directorate, with representatives from the various Bureaus (now Commands), to initiate actual test procurements. More than twenty-five Life Cycle Cost procurements were soon carried out, and Life Cycle Costing techniques and procedures were added to some of the Navy's standardization and value engineering procedures. The Air Force expanded activity already in progress under its Real/Ultimate Cost Regulation (AFLC Reg. 400-20/AFSC Reg. 400-4) and organized Task Groups to develop standard costs and to identify reliability/maintainability prediction techniques which would be particularly useful in Life Cycle Costing.

Later the Defense Supply Agency became interested in testing the second LMI recommendation, awarding contracts for non-reparable equipments on the basis of lowest price per unit of service life. DSA formed a Task Group and named a representative to the DoD Steering Group.

Thus the current DoD Life Cycle Costing Test Program was launched. It is continuing and expanding in the three Military Departments and DSA. Approximately two hundred test procurements have been generated to date.

Early in the Program the DoD Steering Group found it advantageous to prescribe a standard format for reports on test procurements. That format is included in this report as the final exhibit.

As the Test Program gained momentum, it became evident that the role of engineering personnel is critical. In a 4 June 1966 letter to the Director of Defense Research and Engineering, the Assistant Secretary of Defense (IAL) said:

It is clear . . . that in the Departments much of the initiative for employing this concept rests with personnel representing engineering. In fact, it is likely that criteria for evaluation of these logistics factors should be written into equipment specifications.

I am sure that our efforts in this area would be enhanced considerably by the participation of your staff. I think that probably we should consider the assignment of one of your staff as Co-chairman of the DoD Steering Group.

The Director of Defense Research and Engineering responded, "I believe there is considerable promise in the concept of Life Cycle Costing in Equipment

Procurement, and that ODDR&E participation is desirable." He named the Deputy Assistant Director (Engineering Management) to co-chair the DoD Steering Group, along with the Director for Procurement Management.

When the compatibility of DoD financial procedures with the Life Cycle Costing approach to procurement was questioned, the Assistant Secretary of Defense (Comptroller) said (30 June 1966):

"Life cycle costing" . . . is certainly a concept that should be fully exploited in the interest of providing for more complete evaluations of the economic impact of defense programs before they are approved for programming or execution. I do not foresee that our current program/budget or reprogramming procedures should interfere with the execution of program decisions reached as the result of application of "life cycle costing" analyses.

. There is no authority at the present time to transfer funds between appropriations in order to finance increased procurement costs under the circumstance of a decision reached through the application of "life cycle costing." This, however, should not represent any significant constraint . . . since:

1. Sizeable program changes now occur each year and are adequately accommodated within the various appropriations--particularly procurement accounts. . . .
2. The concept will be implemented gradually After the first year, our program/budget should be developed reflecting "life cycle costing" and we would then have to deal only with any deviations from the planned program.

The promise that the DoD Life Cycle Costing Test Program has shown, and the degree of acceptance it has gained, are indicated in a 21 June 1966 statement by the Deputy Assistant Secretary of Defense for Procurement:

The concept of Life Cycle Costing in equipment procurement has the endorsement of top level DoD management. Some of our defense contractors and many representatives of DoD technical disciplines have urged this course of action for some time The logic of this concept is so compelling that we intend to make whatever investment is necessary to exploit it to the fullest possible extent.

Industry Action

From the outset of the DoD Test Program, it was recognized that private industry should play a key role. Since contract awards are involved, Life Cycle Costing has considerable impact on industry. In addition, industry has devoted much study to techniques for predicting and measuring logistics costs. Therefore, private companies and industry associations were invited by the DoD Steering Group to participate in the Program.

The Defense Industry Advisory Council reviewed the Test Program plan and expressed support. The National Security Industrial Association and the Electronic Industries Association established working groups which have met with the DoD Steering Group and evaluated test procurements. American Ordnance Association meetings and the Annual Reliability Symposium have included panels on Life Cycle Costing in procurement. Other associations have inserted Life Cycle Costing into their agendas for future meetings.

Private companies have expressed interest. Collins Radio, General Dynamics, IBM, Lear Siegler, Martin, North American Aviation, RCA, and Westinghouse have participated in sessions with personnel involved in the Test Program. Such sessions are being encouraged by the Steering Group, not only because they are expected to improve Life Cycle Costing methodology, but also because they help assure that the Life Cycle Costing approach endorsed by the Government is acceptable to industry.

LMI's Role

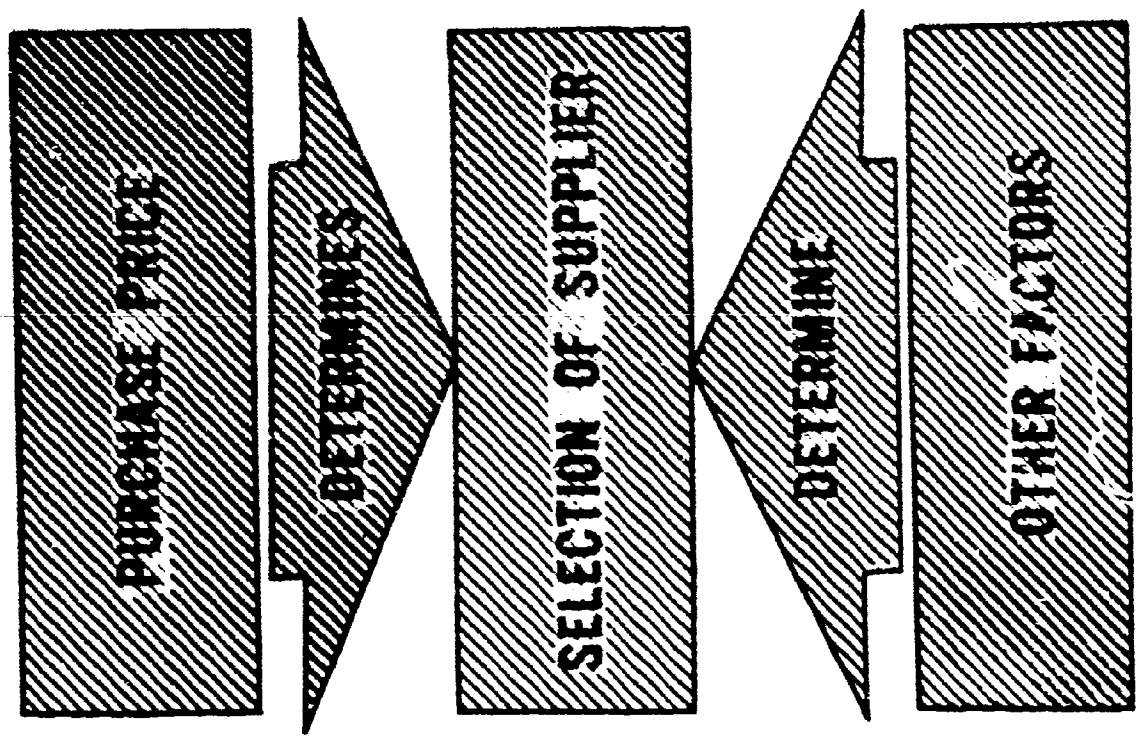
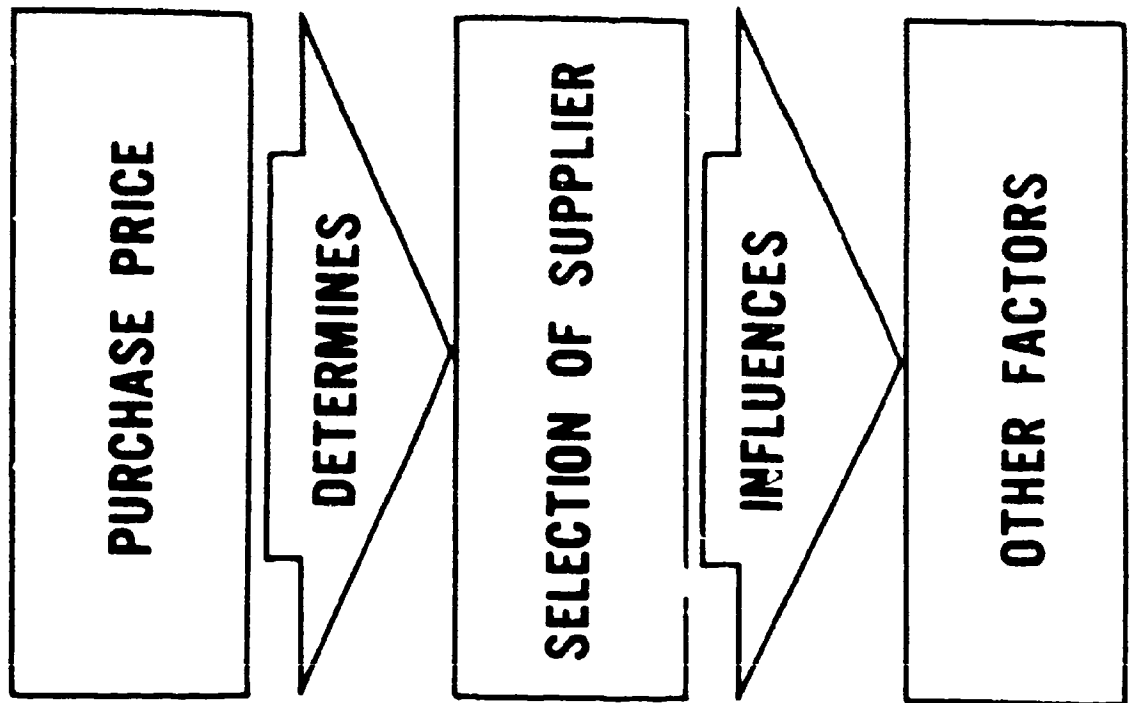
At the request of the Assistant Secretary of Defense (Installations and Logistics), LMI has served during the first one and one-half years of the Test Program as consultant to the DoD Steering Group and technical advisor to the Military Department Task Groups. In those capacities, LMI has reviewed test procurement plans and reports, and has rendered advice and recommendations.

Since the initiation of the Test Program, a great variety of questions have been asked by both Government and industry personnel. The thirty-five questions which have been asked most frequently are answered on the ensuing pages of this supplemental report. Following the questions and answers, synopses of a few of the test procurements are presented.

QUESTIONS

AND

ANSWERS



Q

1. How does Life Cycle Costing differ from normal practice in making contract awards?

A

1. Traditionally, purchase price or acquisition cost (which terms are used interchangeably in this report) has been the sole economic factor in choosing among responsive and qualified bidders. Contractor selection, in turn, has influenced other factors; but that influence has not been heeded prior to time of contract award. (See the left-hand side of the illustration.) In a Life Cycle Cost procurement, purchase price and certain other economic factors jointly influence contractor selection. (See the right-hand side of the illustration.)

-OTHER FACTORS-

LOGISTICS COSTS SUBJECT TO DIFFERENCE

AMONG BIDDERS' DESIGNS

SOURCE SELECTION

QUALIFICATION OF SUPPLIERS

QUALIFICATION OF EQUIPMENT

PATENT AND DATA RIGHTS

BIDDING

SUPPORT

CORRECTIVE AND PREVENTIVE MAINTENANCE

INVENTORY MANAGEMENT

MAINTENANCE AND OPERATIONAL TRAINING

INSPECTION, INSTALLATION AND CHECKOUT

TRANSPORTATION

DOCUMENTATION

OPERATION

Q₂ :

What "other factors" does Life Cycle Costing attempt to consider?

A₂ :

The "other factors" are logistics costs subject to difference among the various bidders' designs. They divide into two groups: Source selection costs and support costs. The support cost group usually includes more dollars; and among support costs, the corrective and preventive maintenance category is generally the most significant, both in terms of total dollars involved and in terms of variability of cost among different bidders' equipments.

The 1965 report, which set forth and defined the cost categories shown to the left, was addressed primarily to procurements of assemblies and sub-assemblies, in which operation cost is not likely to vary significantly among different bidders' versions of the same item. It therefore placed cost of operation in the support cost group. As systems and major subsystems are included in the Life Cycle Cost Program, it will become advisable to make operation costs a third group.

Q₃ :

Why is disposal cost not listed among the support cost categories?

A₃ :

In Life Cycle cost study and experience to date, disposal cost has not been found to vary significantly for different bidders' versions of the same item. If, in any given procurement, it is expected to be a significant variable, there is no reason why it cannot be used as a factor in making the contract award decision. Other cost categories may also be added, if they are believed to improve the ability of the procuring agency to make a source selection in the best interest of the Government.

" . . . one might ask why the committee is now recommending new legislation. The committee recognizes that, standing by itself, much of the existing legislation providing for formal advertising, sealed bids, and award to the lowest responsible bidder could be interpreted as authorizing the exercise of sound discretion by a contracting officer so as to permit him, in appropriate situations, to award a contract in the light of other -- and perhaps more important -- factors than the lowest initial price. However, the committee also recognizes that the time this legislation has been in effect a substantial number of strict administrative interpretations have been made, out of which has grown the present traditional approach that Government contracts must be awarded primarily on a lowest-price basis, irrespective of the best public interest or of lower ultimate cost. While ~~existing law~~ does not require this result it is nevertheless a fact."

-- U. S. Senate Committee on Armed Services

Q 4 : When Congress enacted the law as reflected in Section 2305(c), Title 10, United States Code, did it intend "other factors" to include logistics costs?

A 4 : In its report on the Armed Services Procurement Act of 1947, the Senate Committee on Armed Services explicitly mentioned "lower ultimate cost" as one of the "other factors." The quotation to the left is taken from the 16 July 1947 Report of that Committee (80th Congress, First Session, Senate Report Number 571, "Justification of the Bill"). Underscoring is added.

PROCUREMENT METHOD ALTERNATIVES

SOLE
SOURCE



X
Corp.

PRICE
COMPETITION

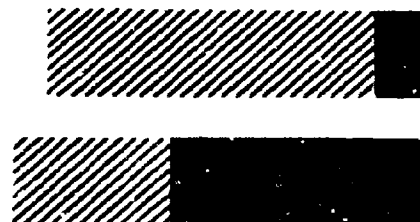


X
Corp.

Y
Corp.

Z
Corp.

COMPETITION WITH
LOGISTICS
COST ANALYSIS



X
Corp.

Y
Corp.

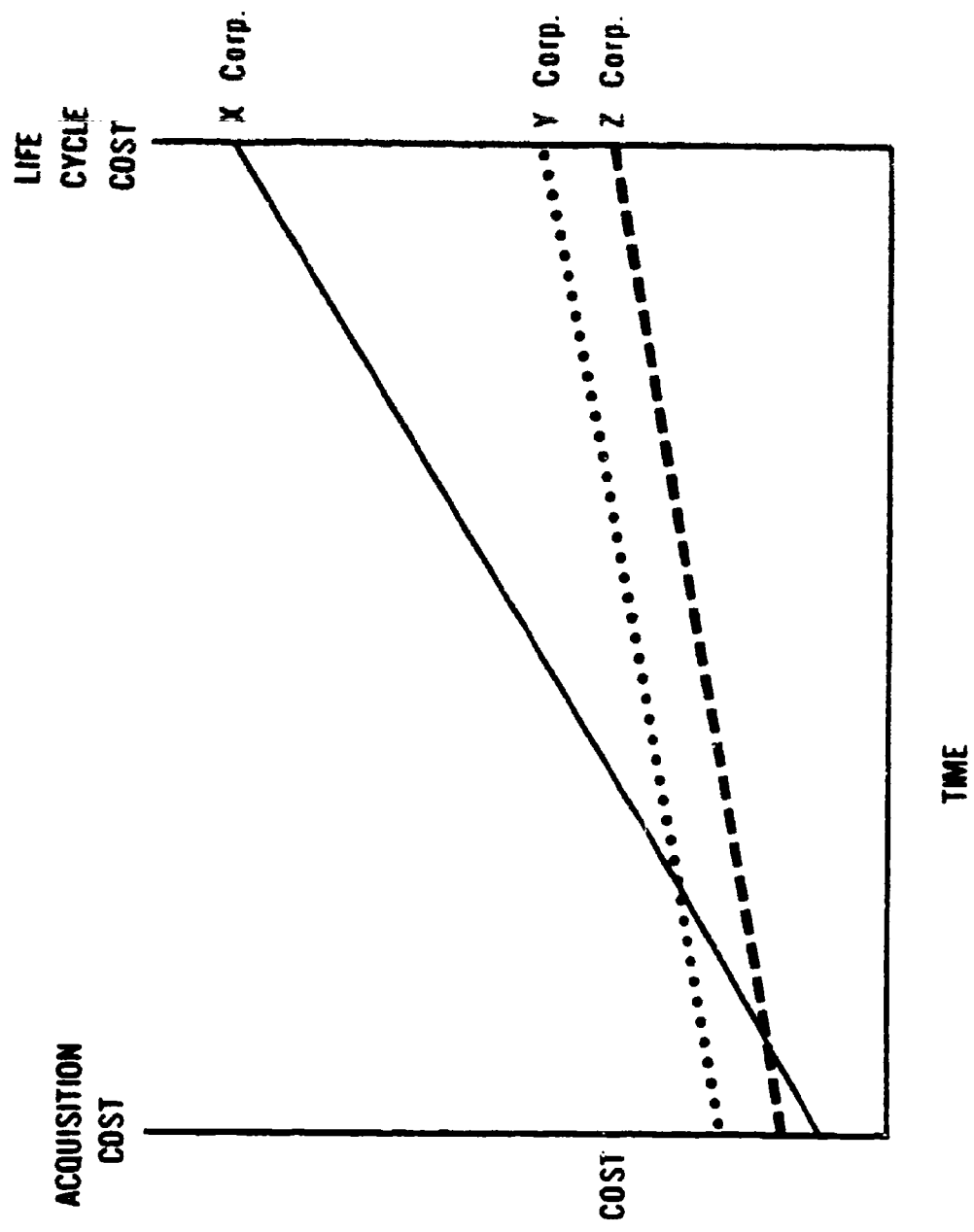
Z
Corp.

Q: Is Life Cycle Costing a new method of procurement?

A: In a sense, it is. In the past, the procurement method alternatives have been sole source and price competition (competition with the contract award based on price alone). Life Cycle Costing introduces a third alternative: Competition on the basis of logistics cost analysis as well as price comparison. The new alternative is sometimes called "Competition with Logistics Cost Analysis."

In the illustration, prices are represented by heights of the solid bars. Estimated logistics costs are represented by the shaded extensions to the solid bars. If the procurement were price competitive, the award would go to Z Corporation. Under competition with logistics cost analysis, X Corporation would get the contract.

The above paragraphs and the illustration exclude design competition, a method of awarding research and development contracts which is not covered by this report. Design competition can be combined with either price competition or competition with logistics cost analysis, as in the case of two-step formal advertising.



Q₆ :

Why is consideration of follow-on logistics costs so important?

A :

In the DoD budget, logistics costs (including spares and repair parts) exceed end item acquisition costs. It is not unusual for the logistics costs of an item to be many times the acquisition cost. Hence, the potential magnitude of logistics costs associated with purchase of an item makes their consideration important.

Furthermore, the logistics costs associated with various bidders' designs frequently differ by a wider margin than do acquisition costs. For the same class of items, annual maintenance cost alone has been found to vary from two percent of acquisition cost to twenty-nine times acquisition cost.

In a large percentage of DoD procurements, therefore, restriction of the economic award criteria to acquisition cost means that the major cost differences associated with the various bids are ignored.

CONTRACTOR LATITUDE IN EQUIPMENT DESIGN

LANGUAGE DESIGNED FOR INCLUSION IN CONTRACTS

In the following quotation from Bureau of Naval Weapons Instruction 4275, Enclosure (2), 9 December 1964, "Supplementary Data" refers to reproducible manufacturing drawings, handbooks, test procedures, etc.:

"(b) It is understood and agreed:

(ii) that the Supplementary Data made available to the Contractor is furnished solely as information, ... with the intent that the Supplementary Data shall not be binding, in whole or in part, on the Contractor...

(iii) that the Supplementary Data and any use thereof shall not give rise to any rights against the Government in connection with the making or performance of this contract. The Contractor acknowledges its understanding that producing or testing the aforesaid equipment or articles in accordance with the Supplementary Data will not necessarily fulfill its obligations under this contract, it being understood and agreed that for purposes of determining the acceptability of the aforesaid equipment or articles..., the specification requirements ... shall govern rather than any of the Supplementary Data.

(d) The Contractor further acknowledges that it is aware of the risk that the Supplementary Data may contain imperfections ... and that such Data may be otherwise inadequate or unsuitable for use in producing or testing the aforesaid equipment or articles in such manner as to fulfill, within the contract delivery schedule, the specification requirements set forth or referenced The Contractor represents that it has taken such risk into consideration in entering into this contract and hereby assumes all such risk."

Q 7 : Why shouldn't equipments produced to the same contract specifications have the same logistics costs?

A : Companies bidding in accordance with the same specifications almost always have some design latitude. Often that latitude is very wide. In many procurements, equipment design is restricted only by form, fit, and function requirements. In many other cases, drawings and design details are given by the Government, but that information extends only to an intermediate level of design. A generator, for example, may be outlined on a drawing and its performance requirements may be stipulated; but the contractor may not be constrained by any internal design requirements.

Even when complete design details or models are provided by the Government, they may not be binding on the contractor. Data and models are frequently "furnished solely as information." Disclaimers of the type shown to the left are by no means unusual in contracts.

No criticism of contractor design latitude is intended. The point to be made is simply that it is usually considered appropriate to allow contractors some degree of design freedom: and different contractors, working to the same specifications, will produce equipments which may differ in design, and therefore may differ in logistics costs.

IMPEDIMENTS TO LIFE CYCLE COSTING

- **EXPERIENCE IN DEFENDING DECISIONS**
- **MULTIPLICITY OF APPROPRIATIONS AND SEPARATION OF FUNCTIONAL RESPONSIBILITIES**
- **LIMITED KNOWLEDGE OF PREDICTION AND MEASUREMENT TECHNIQUES**

Q:

8 • Why has it been normal practice to ignore logistics costs in contract award decisions?

A:

8 • There are three primary reasons: First, contracting officers have experienced great difficulty in defending awards made to other than low price bidders. That difficulty, together with the lack of explicit endorsement of Life Cycle Costing by DoD procurement management, has caused them to be reluctant to employ economic award criteria other than price. Now that more guidance is available for making Life Cycle Cost awards, and now that Life Cycle Costing is endorsed at the highest levels of DoD technical and procurement management, that reluctance should disappear.

8 • Second, the existing multiplicity of appropriations and compartmentalization of functional responsibilities are not conducive to Life Cycle Cost procurement. Usually, end items are procured against one appropriation while logistics functions are supported by others. The importance of assessing overall cost is obscured. Personnel specializing in different functions are usually separated organizationally and have a natural tendency to seek maximum results in their own areas. Often they do not adequately consider the effects of their actions on other functions. Life Cycle Costing requires a greater degree of joint and cooperative effort.

8 • Third, techniques for logistics cost prediction and measurement were not sufficiently refined or were not known by personnel involved in source selection decisions. Many of the currently recommended techniques, particularly those used to assess maintenance cost, did not exist in satisfactory form a few years ago. Some have been employed for many years in engineering decisions but have seldom been used in procurement decisions. The primary need now is not creation of new predictive techniques, but application of existing techniques.

"Take, for example, the contracting officer who determines that a low price is less important in a particular procurement than other valid factors, such as urgency of need, quality of product, or lower ultimate cost. Should he make an award on such a basis to someone other than the lowest bidder he is immediately placed on the defensive and must justify his action or might even be personally charged for the apparent excess cost. This attitude has had the only result which could be expected--the award of contracts in a purely mechanical way to the lowest bidder with no exercise of judgment or discretion on the part of the purchasing officer. The committee is firmly of the opinion that this is not in all cases the best way to conduct a business."

--U. S. Senate Committee on Armed Services

Q : In writing "price and other factors" into the law, did Congress recognize the considerations which have motivated contracting officers to award contracts on the basis of price only?

A : Yes. The quotation to the left clearly shows that Congress understood the pressures that contracting officers have been under to make awards to the low price bidder. That quotation, like the one accompanying Answer Number 4, is taken from the "Justification of the Bill" in the Report of the Senate Committee on Armed Services on the Armed Services Procurement Act of 1947. It is clear from the context that the term "lowest bidder" refers to the bidder whose price is lowest. Underscoring is added.

"1-326.2 Policy. Whenever it is anticipated that the prime contract . . . will be awarded without adequate price competition, and the prime contractor is expected to acquire a component without such competition, it is Department of Defense policy to break out that component if:

- (i) substantial net cost savings will probably be achieved; and**
- (ii) such action will not jeopardize the quality, reliability, performance or timely delivery of the end item.**

The desirability of breakout should also be considered . . . whenever substantial net cost savings will result (A) from greater quantity purchases or (B) from such factors as improved logistics support through reduction varieties of spare parts and economies in operations and training through standardization of design."

--Armed Services Procurement Regulation

Q: 10 • Isn't the Life Cycle Cost approach inconsistent with the DoD emphasis on competition and with the Component Breakout Program?

A: 10 • No. It provides a more comprehensive and rational basis for competition. The Procurement Method Decision can only result in the sole source alternative if that alternative can be justified by reasons stated in Armed Services Procurement Regulation 3-200. Otherwise, competition must be secured. That competition should be based on Life Cycle Cost when an overall advantage to the Government is expected to result.

The DoD Life Cycle Costing Test Program has demonstrated that the availability of the Life Cycle Cost approach can make practicable the competitive procurement of an item for which sole source procurement was previously considered necessary. Competition has been infeasible for some items because award to a new supplier might result in substantially increased operating and support problems. Life Cycle Costing has been used to preclude such a result, while at the same time taking advantage of the benefits of competition.

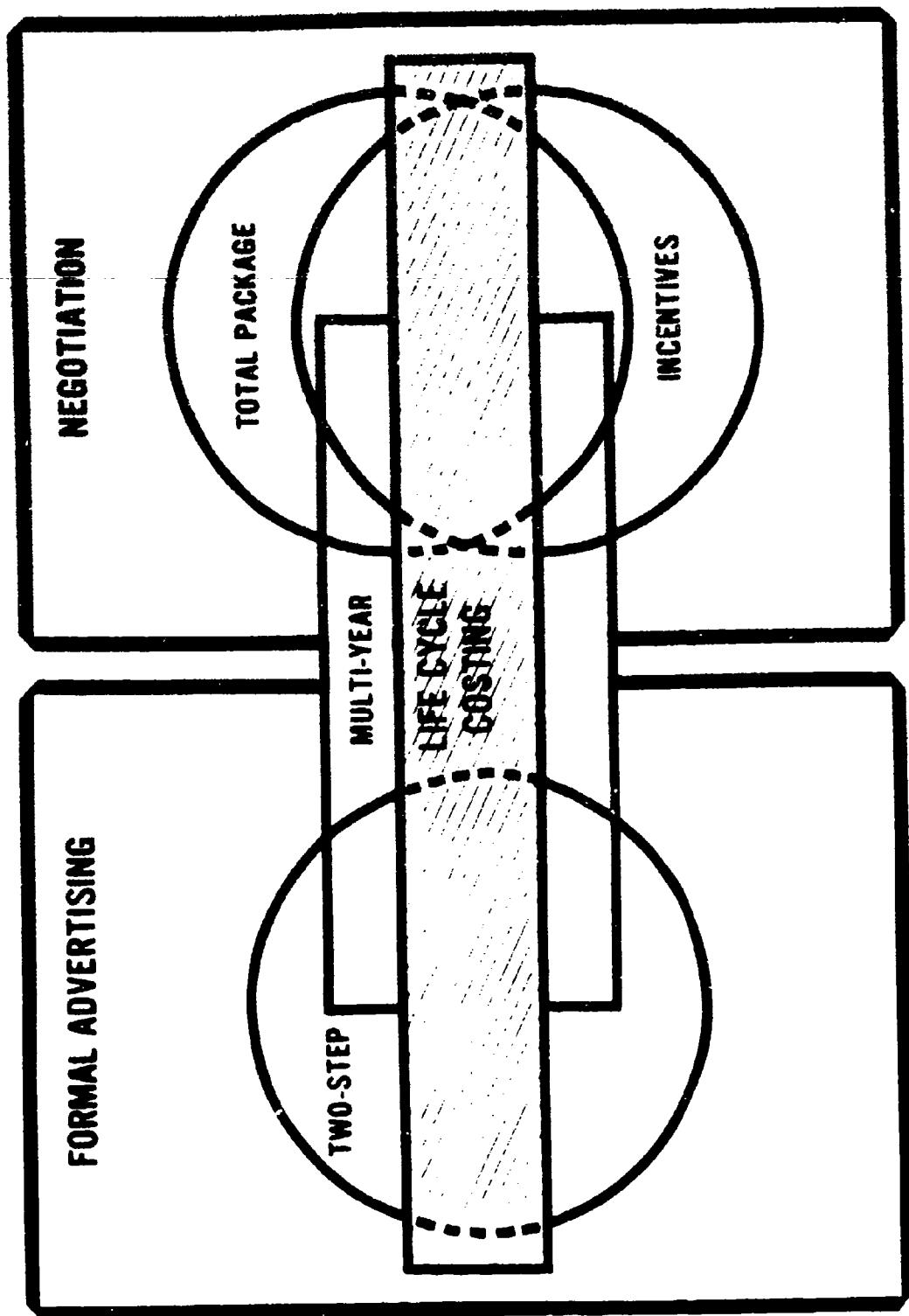
The Armed Services Procurement Regulation quotation to the left shows that the Life Cycle Cost concept is not inconsistent with the rationale of the Component Breakout Program.

	<u>X Corp.</u>	<u>Y Corp.</u>	<u>Z Corp.</u>
BID PRICE	\$42,000	\$60,000	\$47,000
	<div>LOW PRICE BIDDER</div>		
FIVE YEAR MAINTENANCE	129,000	116,000	84,000
INTRODUCTION OF NEW ITEMS	10,000	20,000	10,000
FIVE YEAR INVENTORY MANAGEMENT	45,000	30,000	42,000
NEW DOCUMENTATION	12,000	18,000	12,000
OPERATIONAL TRAINING	8,000	8,000	8,000
	\$246,000	\$252,000	\$203,000
			<div>LOW BIDDER</div>

Q¹¹ • Does not competition with logistics cost analysis represent a departure from the rule that contracts be awarded to the low bidder?

A¹¹ • No. A Life Cycle Cost award is made to the low bidder--low on the basis of all the factors designated as award criteria in the IFB or RFP. The low price bidder is not necessarily the low bidder when factors other than bid price are designated.

In the illustration the equipment of the low price bidder has an expected total cost of \$246,000. Under Life Cycle Costing, a \$47,000 contract would be awarded to the low bidder; viz., the bidder whose equipment has the lowest expected total cost (\$203,000).



Q

12. The LMI Report of April 1965 recommended Life Cycle Costing application in negotiated competitive procurements. Doesn't it have equal applicability in formal advertising?

A

12. Yes. In fact, most of the procurements in the Life Cycle Cost Test Program have been formally advertised. Some have employed the two-step method. LMI recommended that Life Cycle Costing application initially be restricted to negotiated competitive procurements because it believed that the award criteria "clarity and definiteness" required by the Comptroller General might be difficult to attain until experience was gained in the use of logistics cost analyses. Military Department personnel have demonstrated that the restriction was unnecessary.

Test experience has shown that Life Cycle Costing can be advantageously combined with two-step formal advertising and multi-year procurement. Early work in applying Life Cycle Costing to major system acquisition indicates that it can also be combined with total package procurement. Furthermore, all possible combinations of the procurement methods shown in the illustration have been found to be capable of joint application with Life Cycle Costing.

"The chief legal problem . . . is not whether such factors may properly be used in evaluating bids, but whether these factors can be stated with sufficient clarity and definiteness to enable bidders to know precisely how their bids will be evaluated."

- B-151177, 17 June 1963

"To permit bidders to compete on equal terms, the invitation must be sufficiently definite to permit the preparation and evaluation of bids on a common basis. Bidders cannot compete on an equal basis as required by law unless they know in advance the basis on which their bids will be evaluated. . . .

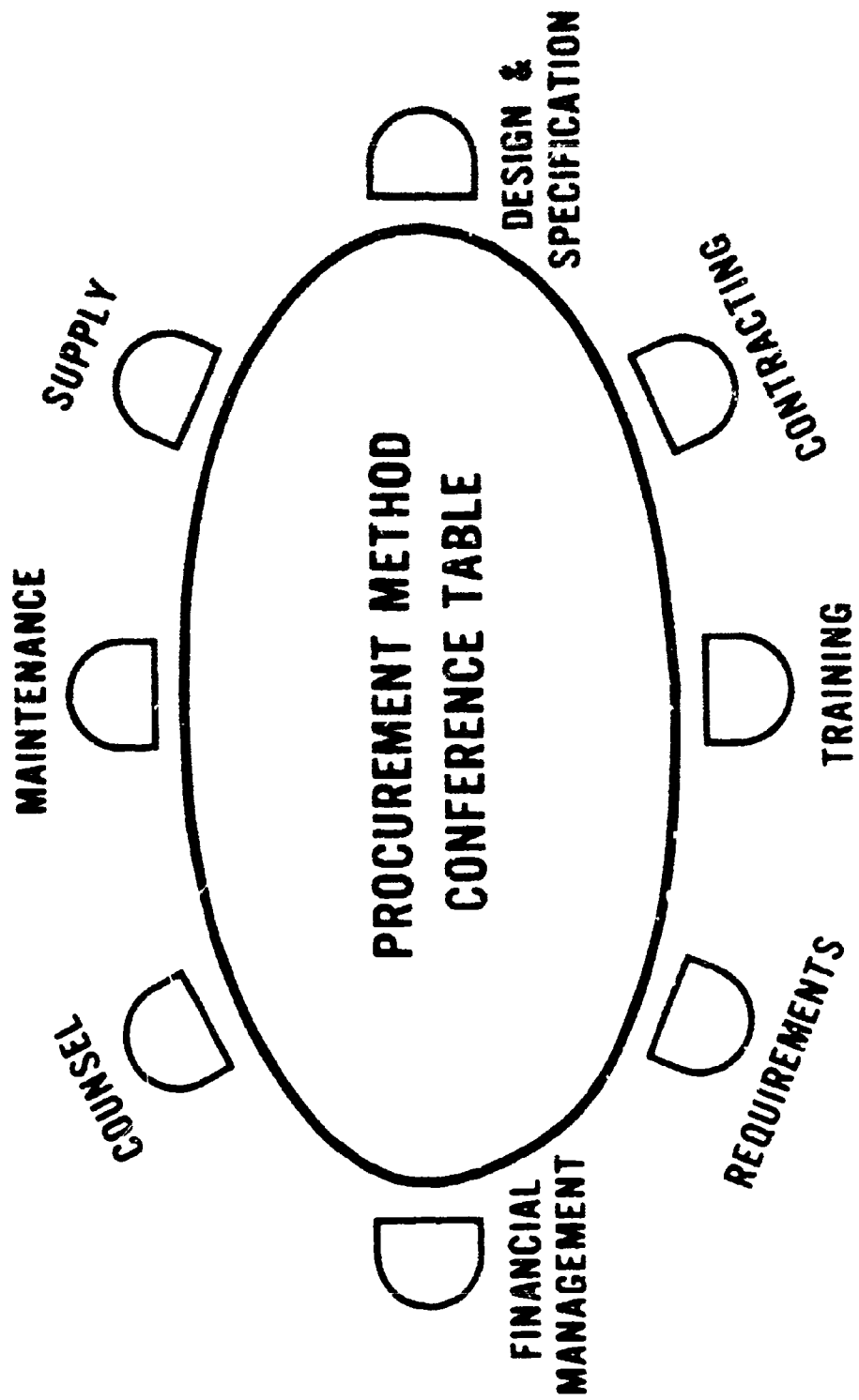
"The 'basis' of evaluation which must be made known in advance to the bidders should be as clear, precise and exact as possible. Ideally, it should be capable of being stated as a mathematical equation. In many cases, however, that is not possible. At the minimum, the 'basis' must be stated with sufficient clarity and exactness to inform each bidder prior to bid opening, no matter how varied the acceptable responses, of objectively determinable factors from which the bidder may estimate within reasonable limits the effect of the application of such evaluation factor on his bid in relation to other possible bids. By the term 'objectively determinable factors' we mean factors which are made known to or which can be ascertained by the bidder at the time his bid is being prepared. Factors which are based entirely or largely on a subjective determination to be announced by representatives of the contracting agency at the time of or subsequent to the opening of bids violate the principle for the reason that they are not determinable by the bidder at the time his bid is being prepared."

Q₁₃:

Will the Comptroller General support contract awards based on Life Cycle Cost?

A:

13. Past decisions dealing with the inclusion of logistics costs in bid evaluation strongly suggest that the Comptroller General will support such awards, provided that the award criteria are made known in advance to the bidders with "clarity and definiteness." Recommendations of the DoD Life Cycle Costing Steering Committee reflect a conservative interpretation of the Comptroller General's stipulation that award criteria be presented in a straightforward and unambiguous manner in the IFB.

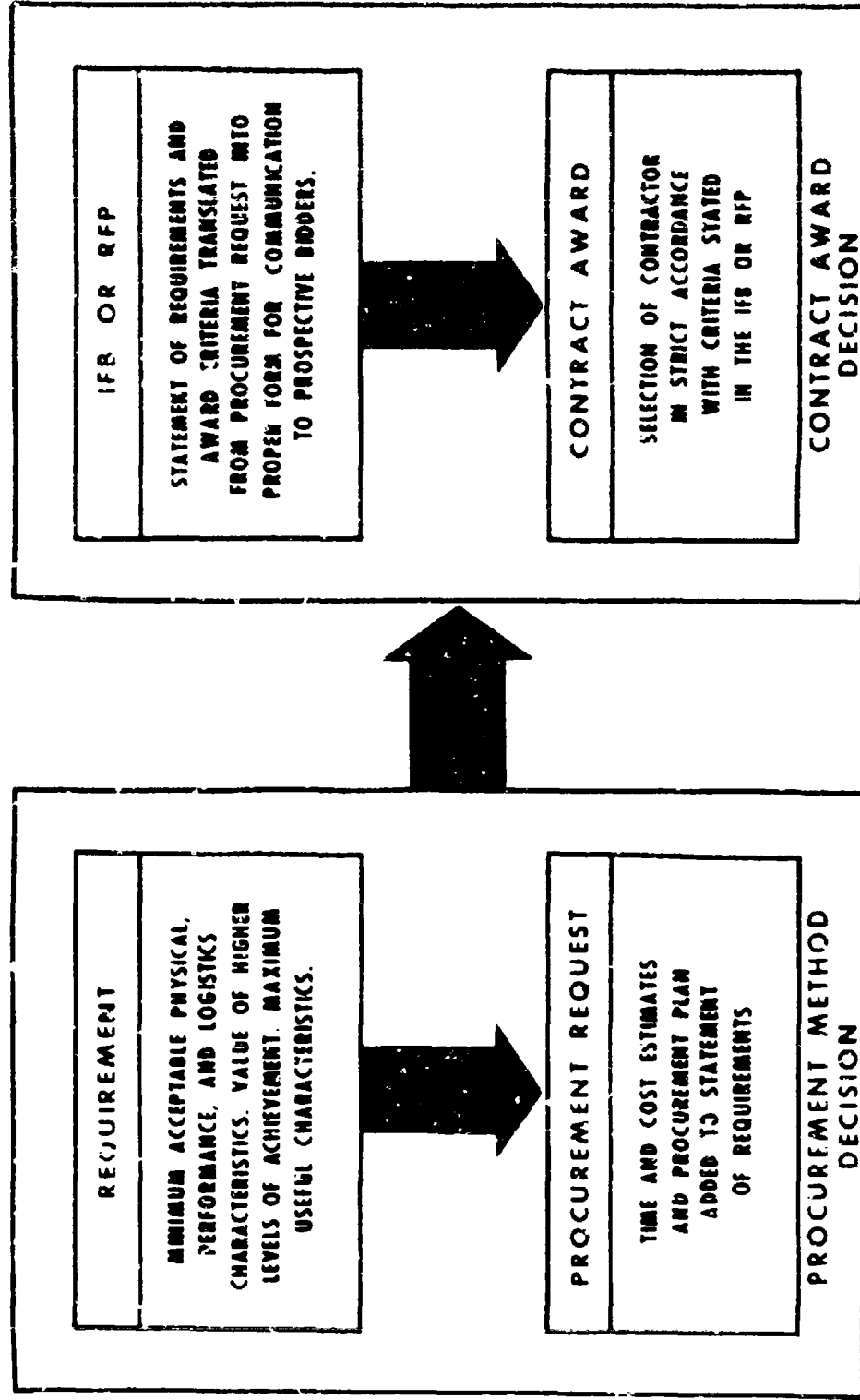


Q: Since logistics costs are generally outside the purview of negotiators and buyers, how can those personnel be expected to evaluate such factors in the Procurement Decision Process?

A: Negotiators and buyers cannot be expected to plan and execute Life Cycle Cost procurements by themselves. Teamwork among specialists in design and specification, financial management, and all the logistics disciplines is required. That teamwork is crucial in the Procurement Method Decision Process and in preparation of the Procurement Request.

"Hard data" are usually not available for answering numerous questions leading to the Procurement Method Decision. Nor are time and funds available for a long and detailed analysis. The systematically applied judgment of experts in pertinent functional areas can, however, produce a sound decision. Moreover, a sound Procurement Method Decision cannot be assured in any other way.

PROCUREMENT DECISION PROCESS



Q¹⁵ • Shouldn't a substantial part of the Government work required for a Life Cycle Cost procurement be done in Advance Procurement Planning?

A¹⁵ • Much, if not all, of the Procurement Method Decision Process should probably be accomplished in Advance Procurement Planning. Once a Procurement Method Decision has been made in favor of the Life Cycle Cost alternative, the logistics costs to be included among the award criteria are known, and methods for quantifying those logistics costs and verifying bidders' claims are established. Consequently, a detailed Life Cycle Costing plan should be included in the Procurement Request which results from Advance Procurement Planning.

PREREQUISITES FOR LIFE CYCLE COSTING

- **ABILITY TO PREDICT LOGISTICS COSTS WITH REASONABLE
CONFIDENCE**
- **BIDDERS' CLAIMS MUST BE CAPABLE OF VERIFICATION**
- **STATEMENT OF CRITERIA IN RFP WITH "SUFFICIENT CLARITY
AND DEFINITENESS TO ENABLE BIDDERS TO KNOW
PRECISELY HOW THE BIDS WILL BE EVALUATED"**
- **ANALYSIS IS ECONOMICALLY FEASIBLE**

Q¹⁶ :

What are the prerequisites for using the Life Cycle Costing procurement method?

A¹⁶ :

The first prerequisite is ability to predict logistics costs with reasonable confidence. One hundred percent accuracy is by no means essential; but cost projections must be sufficiently accurate that the resultant contract award is expected to be more in line with Government interests than an award on the basis of price alone.

Second, bidders' claims must be capable of verification. That verification can be accomplished in a variety of ways. Sometimes bid samples can be obtained and tested. Sometimes a conclusive analytic review of bidder-conducted logistics cost analyses is possible. Sometimes bidders' claims can be accepted for evaluation purposes, with the successful bidder's claims being written into the contract, along with post-delivery demonstration requirements and associated penalty provisions.

Third, the award criteria must be stated in the IFB or RFP in clear and definite terms.

Fourth, the logistics cost analysis must be economically feasible. That is, the resultant benefits of that analysis must be expected to exceed the resources needed to conduct it.

MEASURE OF LIFE CYCLE COST FOR PURPOSE OF CONTRACT AWARD

MULTIPLE APPLICATION EQUIPMENTS

$$\text{LCC Measure} = \sum_{i=1}^n P_i C_i = P_1 C_1 + P_2 C_2 + \dots + P_n C_n$$

Where P_i = The Probability That The Equipment Will Have Application i ,

And C_i = The Life Cycle Cost (or Cost Per Unit Of Service Life) Of The Equipment If It Is Given Application i .

Q

17. Isn't Life Cycle Costing restricted to those procurements in which the equipment to be purchased has a single application only?

A

17. No. Like specification writing, Life Cycle Costing is simpler if only one use is anticipated for the equipment. Multi-use equipments can be purchased, however, on a Life Cycle Cost basis. Logistics costs can be analyzed for each use. Award can be made on the basis of a weighted average of the Life Cycle Cost estimates for the various uses. Weightings, based on probabilities of the different uses or on percentages of the purchase quantity expected to receive the different uses, must be announced in the IFB or RFP.

Often the above weighted average technique is not required. If overall costs of the possible uses are not expected to differ significantly, or if the cost of one specific use is considered to be a good approximation of the average cost of all uses, Life Cycle Cost evaluation can be performed on the basis of one particular application.

PROCUREMENT METHOD DECISION PROCESS

SELECTS ONE OF THREE PROCUREMENT METHOD ALTERNATIVES:

SOLE SOURCE
PRICE COMPETITION
COMPETITION WITH LOGISTICS COST ANALYSIS

INVOLVES THE USE OF:

READILY AVAILABLE DATA
EXPERT OPINION

NECESSITATES:

CAREFUL LOGICAL STRUCTURING
COLLECTIVE DELIBERATION BY VARIOUS FUNCTIONAL SPECIALISTS

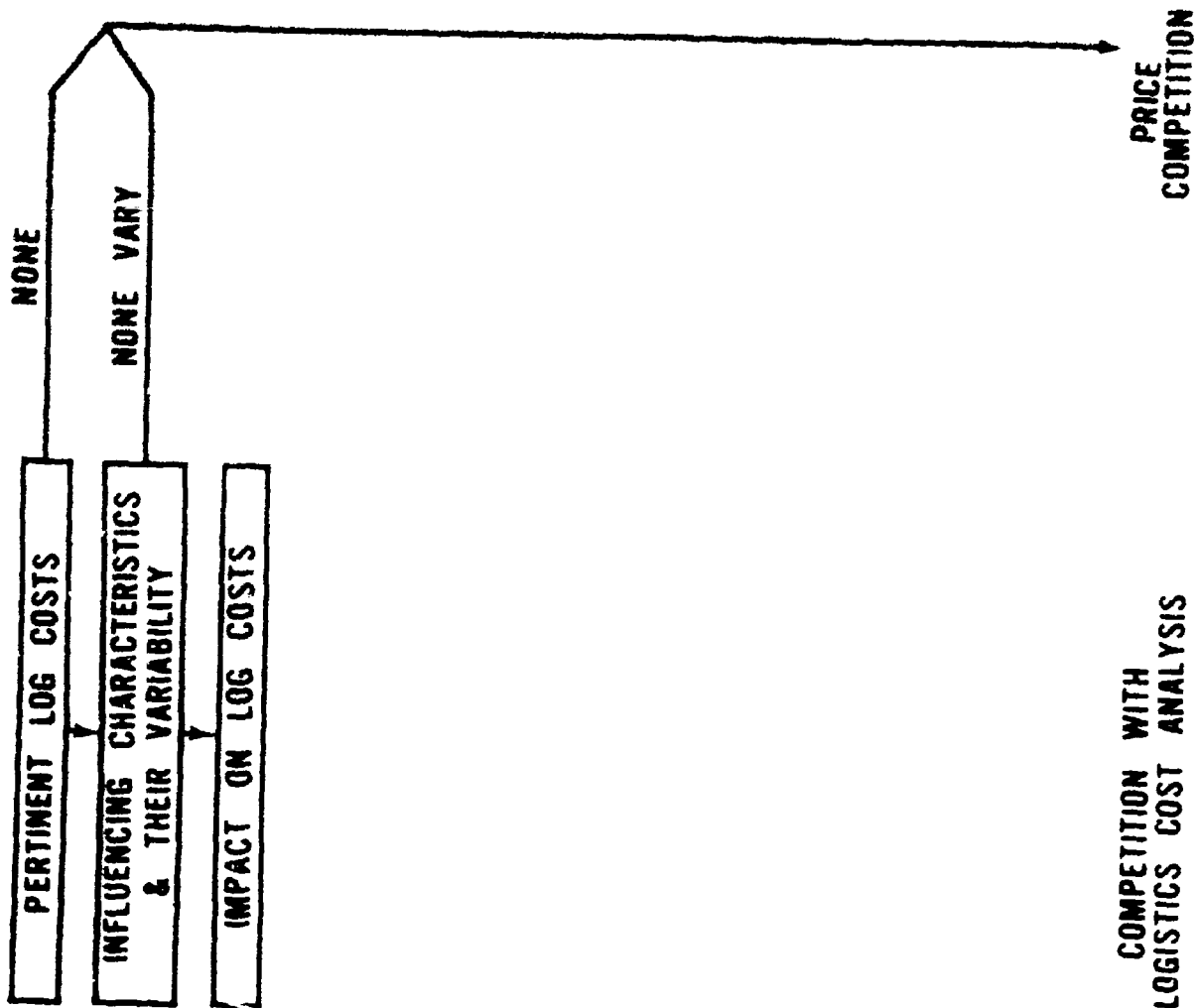
Q. 18. What is the procedure for determining whether Life Cycle Costing should be applied in a procurement?

A. 18. The Procurement Method Decision Process is a screening procedure for establishing whether a procurement should be negotiated with a single source, competitive with the award based on price, or competitive with the award based on price plus certain logistics costs. The last alternative is called "Competition with Logistics Cost Analysis" or "Life Cycle Costing." In the LMI report of April 1965 the Procurement Method Decision Process (then called "Model 1") was presented in flow chart form as a sequence of sixteen questions. This answer will describe the process in more general terms.

It should first be noted, however, that the Procurement Method Decision is a preliminary decision. An elaborate, detailed, and thus expensive procedure would be inconsistent with its purpose. It must be rendered on the basis of readily available and easily reviewed data and expert opinion. That restriction does not, however, preclude sound decision-making. It simply necessitates that close attention be given to logical structuring of the process, and that the resultant decision be a joint product of specialists in the various pertinent functional areas. Collective systematic judgment, even when based on less than complete information, can produce results which transcend any individual judgment.

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**PROCUREMENT
METHOD
DECISION**



**SOLE
SOURCE**

**COMPETITION WITH
LOGISTICS COST ANALYSIS**

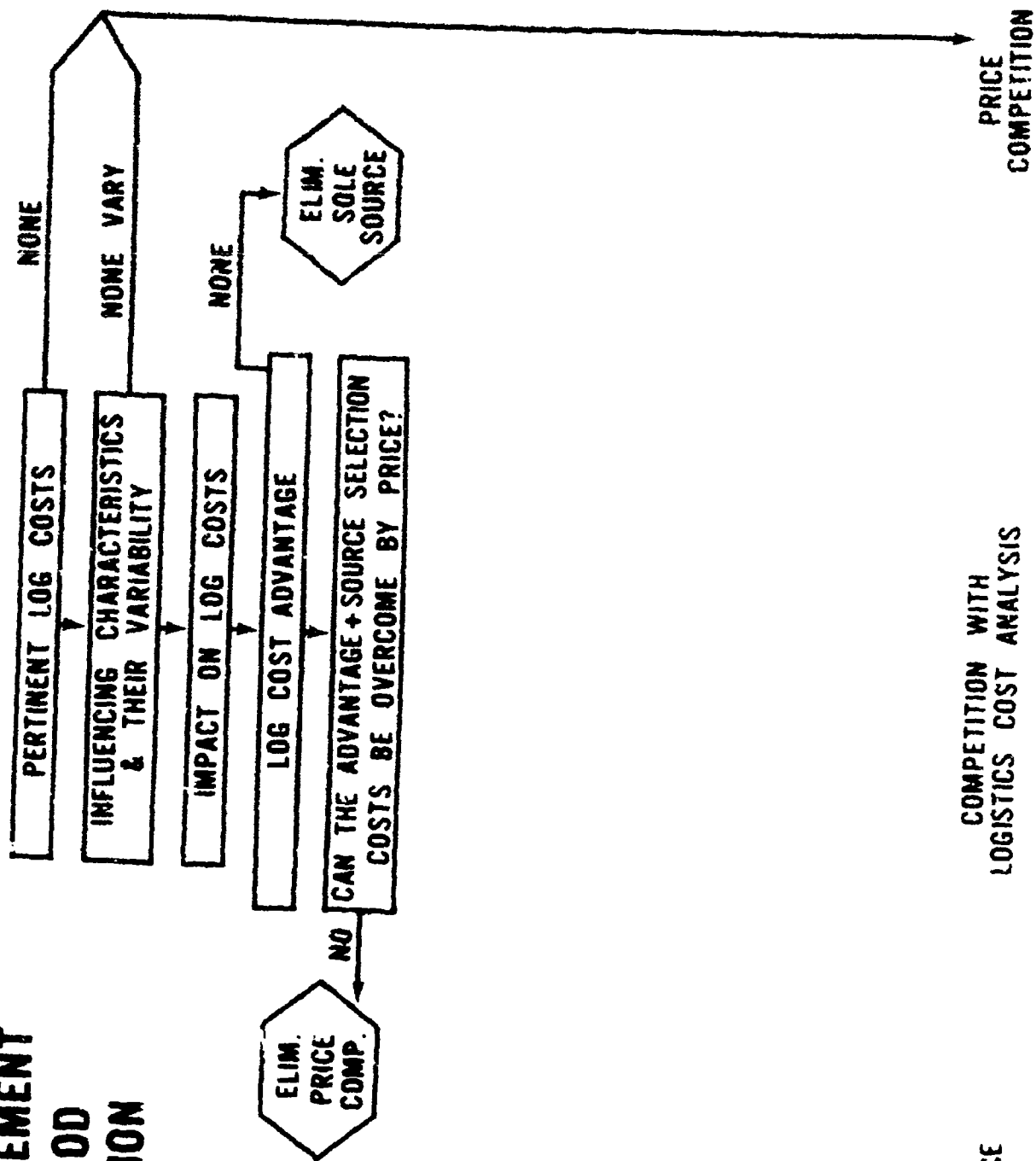
A 18, Continued.

The process starts with identification of the logistics costs associated with the item to be procured. It then establishes the physical or functional equipment characteristics which influence those logistics costs and the extent to which the influencing characteristics are likely to vary among bidders' products. If there are no significant logistics costs associated with the item, or if the influencing characteristics are not subject to variation among bidders, then an immediate decision can be made for price competition.

Otherwise an estimate must be made of the impact that the variation in equipment characteristics can have on logistics costs. If maintenance cost, for example, is a significant logistics cost associated with the item, and reliability is an influencing characteristic, then it would be necessary to answer: How much might mean-time-between-failures (MTBF) be expected to vary among bidders' products? And how much could that MTBF variation mean to the Government in maintenance cost over the life of the item (or over some other specified period)?

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PROCUREMENT METHOD DECISION



SOLE
SOURCE

COMPETITION WITH
LOGISTICS COST ANALYSIS

PRICE
COMPETITION

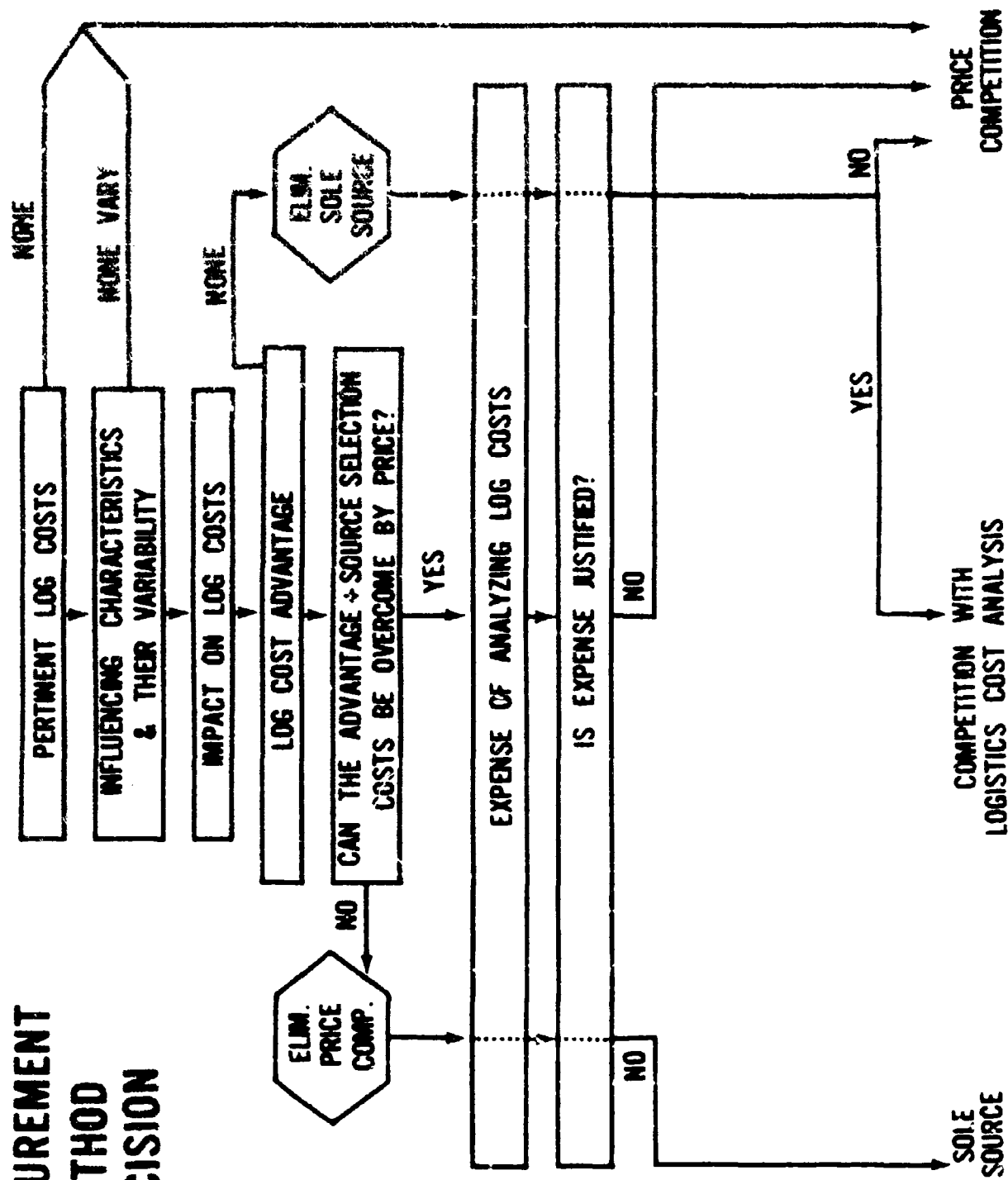
A18, Continued:

The next subject for consideration is cost duplication which might be avoided by making the contract award to a particular previous supplier. There are many possible circumstances which could create the opportunity for such cost avoidance. Perhaps parts have been stocked in large quantity for a particular model and probably would not be useful for another model. Perhaps personnel have been trained or support equipment has been installed for a particular model. Perhaps expensive documentation has been purchased and would not be applicable to another bidder's product. Such a circumstance would constitute a "logistics cost advantage" to the Government of awarding the contract to the previous supplier. If no such circumstance exists, then the sole source decision should be eliminated.

If a logistics cost advantage is associated with award to a previous supplier, then the following question must be answered: Is it reasonable to assume that the price of some other bidder's product can be low enough to overcome the logistics cost advantage plus the additional costs of competitive source selection? If not, the price competition alternative should be eliminated.

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PROCUREMENT METHOD DECISION



A 18, Continued.

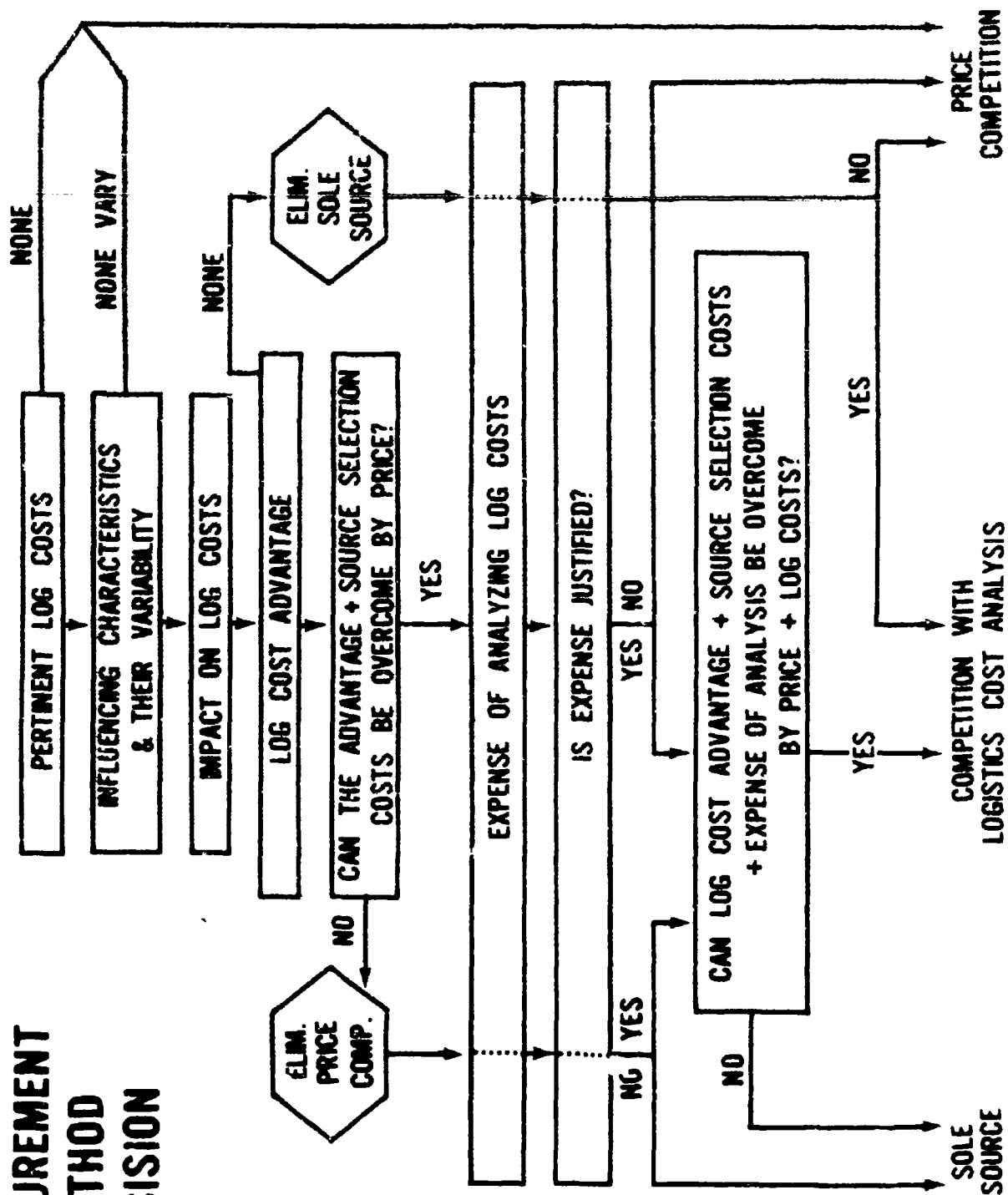
The next step is to assess the expense of analyzing, during the procurement process, the logistics costs previously identified as being subject to significant difference among the various possible bidders' products. Consideration must be given to the available cost estimation techniques. Comparing the expense of analyzing the logistics costs with their possible variation among bidders, it must be decided whether the expense is justified. The verdict may be that analysis of some logistics costs can be justified, while analysis of others cannot be.

If the expense of analysis cannot be justified for any logistics cost category, then the competition with logistics cost analysis alternative is eliminated. If the sole source alternative has also been eliminated, then the procurement should be price competitive. If price competition has been eliminated, then the sole source verdict should be accepted. Even if neither sole source procurement nor price competition has been eliminated, the price competition verdict should be accepted; for in that case it has already been established that the logistics cost advantage plus the additional costs of competitive source selection can be overcome on the basis of price.

If the sole source alternative has been eliminated and analysis of some logistics cost category is economically justified, then the verdict should be competition with logistics cost analysis.

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PROCUREMENT METHOD DECISION

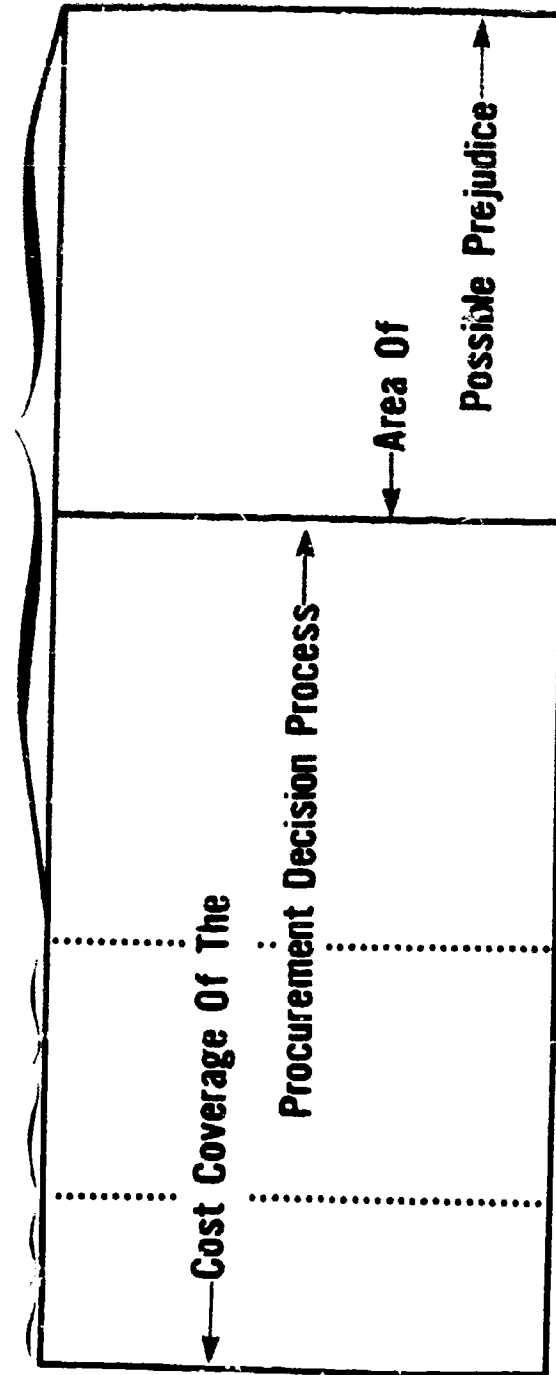


A18, Continued.

If a procurement method has not yet been selected, then the choice is between competition with logistics cost analysis and sole source negotiation with the previous supplier whose product represents a logistics cost advantage to the Government. The final question to be answered in that event is: Is it reasonable to assume that the price plus logistics costs of some other bidder's product can be low enough to overcome the logistics cost advantage plus the additional costs of competitive source selection plus the expense of logistics cost analysis? If not, the sole source verdict should be accepted. If so, then the procurement should be competitive with the contract award based on the logistics costs as well as purchase price.

**SOURCE
SELECTION
COSTS**

OPERATION AND SUPPORT COSTS



Q 19. In almost all Life Cycle Cost procurements, some types of cost are included in the award criteria while others are not. Doesn't that circumstance work to the unfair advantage of some bidders?

A 19. It can; but the Life Cycle Cost approach helps minimize the problem. Under price competition, many bidders are being prejudiced against because low operation and support costs of their products are not considered at all in award of contracts. Complete elimination of that problem may be impossible; but as more and more logistics cost coverage is achieved, there will be a gradual shrinking of the area of possible prejudice.

PROCUREMENT BY NEGOTIATION

"3-213 Technical Equipment Requiring Standardization and Interchangeability of Parts

3-213.2 Application

(b) This authority would apply, for example, whenever it is necessary:

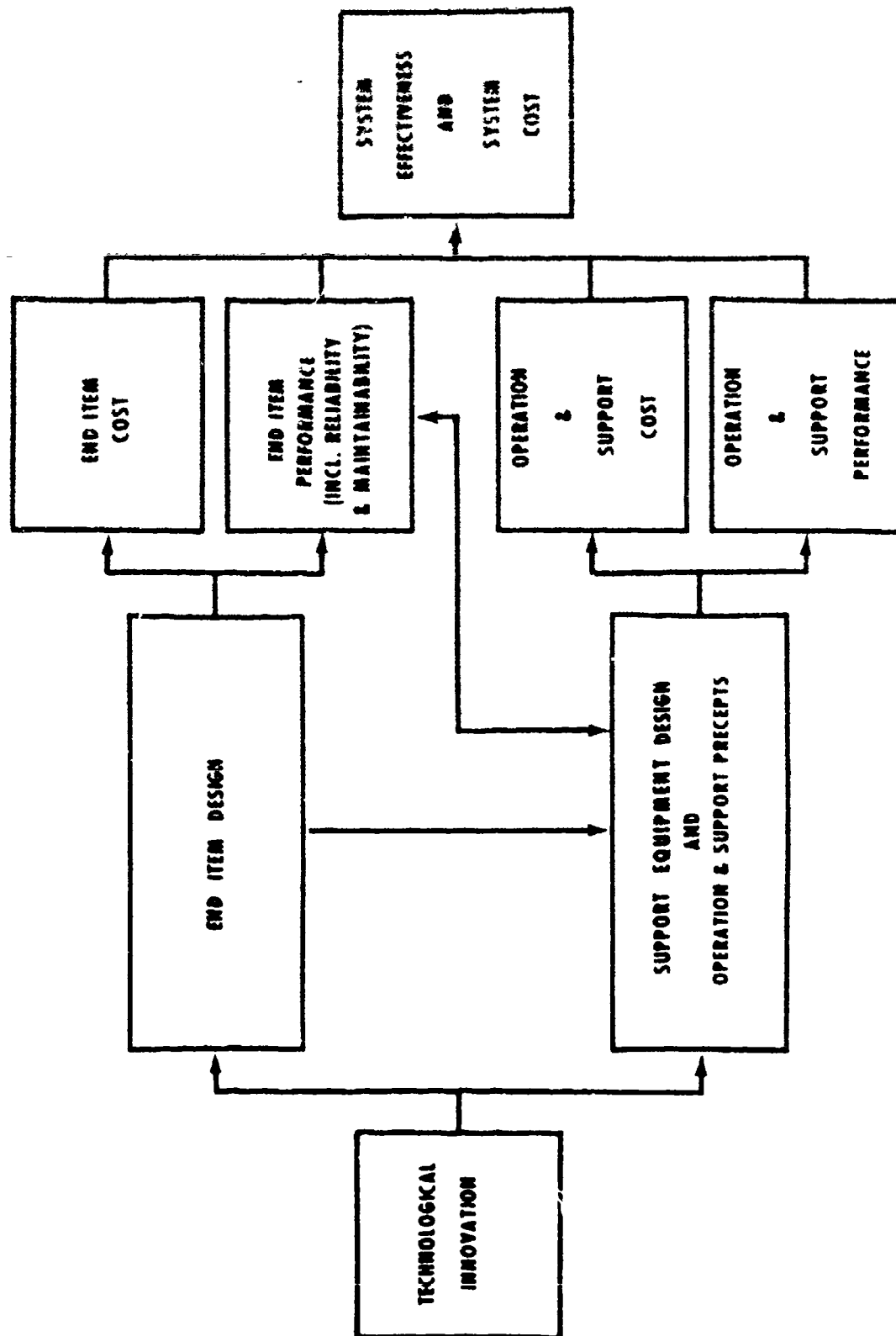
- (i) to limit the variety and quantity of parts that must be carried in stock;
- (iii) to procure from selected suppliers technical equipment which is available from a number of suppliers but which would have such varying performance or design characteristics (notwithstanding detailed specifications and rigid inspection) as would prevent standardization and interchangeability of parts;
- (c) Before making a determination to procure specified makes and models under the authority of this paragraph 3-213, consideration shall be given to whether:
 - (vi) standardization will serve to reduce or prevent an increase in the variety of parts that must be carried in stock;
 - (ix) savings in training personnel or procuring technical literature will accrue;
 - (xii) in cases where military mission capability is not overriding, the anticipated savings to be obtained from standardization, arrived at through an overall economic evaluation, . . . will equal or exceed the expected savings which would be obtained through unrestricted competition"

Q 20 • If the Procurement Method Decision yields a sole-source result, under which exception of 10 USC 2304(a) can authority to negotiate be obtained?

A 20 • Most of the logistics costs which can be considered in a Life Cycle Cost procurement relate to justifications which are listed in ASPR 3-213, "Technical Equipment Requiring Standardization and Interchangeability of Parts." It is likely, therefore, that standardization will have been justified if the Procurement Method Decision Process results in a sole-source verdict. It must be recognized, however, that if standardization cannot be justified, the verdict must be price competition or competition with logistics cost analysis.

Q 21 • Does the Life Cycle Costing concept conflict with standardization policies?

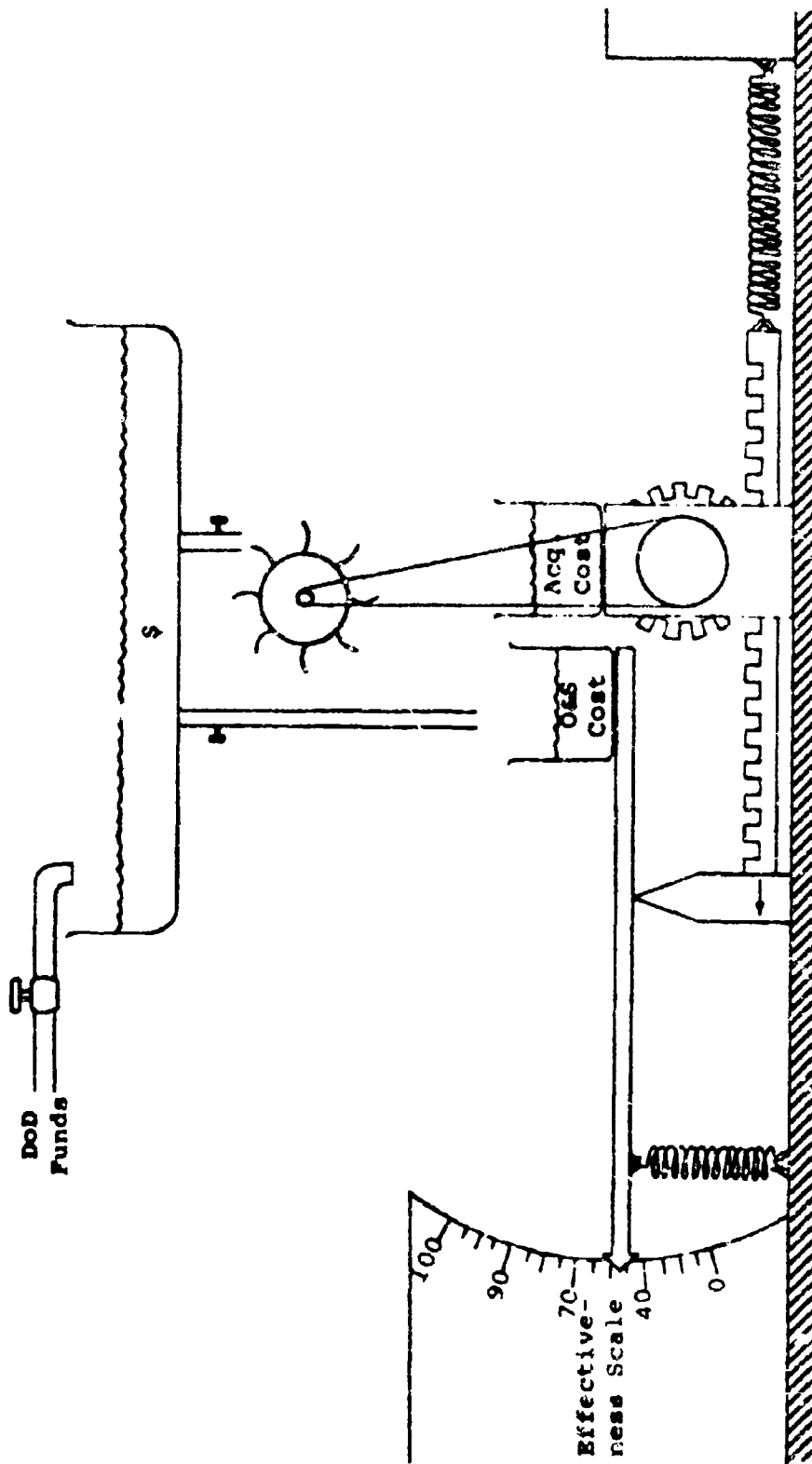
A 21 • No. Competitive Life Cycle Cost procurement is not recommended when there are sound technical or military reasons for standardization on a specific make or model item. When there are sound economic reasons for standardization, the Life Cycle Cost approach should result in purchase of the appropriate item. When the advisability of standardization is being assessed, Life Cycle Costing can be helpful in performing the standardization analysis.



Q: Standardization requires judicious restraint in application lest it impede technological advancement. Is that also true of Life Cycle Costing?

A: Life Cycle Costing does not impede technological advancement. It encourages a more advantageous distribution of technical effort among end item equipment design, support equipment design, and operation and support precepts. Since Life Cycle Costing award criteria are more comprehensive than acquisition cost criterion, a better balance of contractor innovative effort should result.

Competition based on price alone directs contractor technical effort toward designing equipment which can be produced at low cost, even when that effort also yields operation and support cost increases which more than offset the production cost savings. Optimization of total system cost/effectiveness cannot be expected to result.



$$\frac{\text{Cost}}{\text{Effectiveness}} = \frac{\text{Acquisition Cost} + \text{Operation and Support Cost}}{\text{Effectiveness}}$$

Q:

23. Doesn't the Life Cycle Costing approach to procurement tend to understate the importance of military effectiveness objectives?

A:

23. No. Life Cycle Costing does not affect performance or effectiveness objectives and criteria. Nor does it increase the importance of cost relative to that of performance or effectiveness. Life Cycle Costing provides a more rational means for achieving an optimum balance between cost and effectiveness. There can be no assurance that a cost/effectiveness relationship is optimum if the cost portion of that relationship is measured only in terms of purchase price or acquisition cost.

The most advantageous cost/effectiveness result can be realized only when acquisition cost and operation and support cost are in proper balance. In the illustration, additional expenditure for acquisition (to obtain a better product) causes the fulcrum to move to the left. That movement makes possible a greater level of effectiveness for the same operation and support (O&S) cost, or, conversely, the same level of effectiveness for less O&S cost. For any fixed supply of funds, there is only one combination of acquisition cost and O&S cost which will yield maximum effectiveness. For any fixed level of effectiveness, there is only one ratio of acquisition cost to the O&S cost which will produce that effectiveness at lowest total cost.

REQUIREMENT: 100 Equipment Units, With Minimum Mean-Time-Between-Failures (MTBF) Of 0.5 Year And Maximum Mean-Time-To-Restore (MTTR) Of 5.0 Hours.

AWARD CRITERION: Purchase Price + Installation Cost + Maintenance Cost Over A 4-Year Period. \$20/Hour To Be Used As The Cost Of Corrective Maintenance.

	CASE A		CASE B	
	X Corp.	Y Corp.	Y Corp.	Z Corp.
PURCHASE PRICE (\$)	500	700	700	300
INSTALLATION COST(\$)	50	100	100	30
MTBF (Years)	0.5	1.0	1.0	0.5
MTTR (Hours)	3.75	3.0	3.0	4.0
4-YEAR TOTAL COST (See Calculations Below)	\$115,000	\$104,000	\$104,000	\$97,000

$$X \text{ CORP.: } 100 \text{ Units} \left[\$500 + \$50 + \frac{4 \text{ Years}}{0.5 \text{ Year}} \left(3.75 \text{ Hours} \times \$20/\text{Hour} \right) \right] = \$115,000$$

$$Y \text{ CORP.: } 100 \text{ Units} \left[\$700 + \$100 + \frac{4 \text{ Years}}{1.0 \text{ Year}} \left(3.0 \text{ Hours} \times \$20/\text{Hour} \right) \right] = \$104,000$$

$$Z \text{ Corp.: } 100 \text{ Units} \left[\$300 + \$30 + \frac{4 \text{ Years}}{0.5 \text{ Year}} \left(4.0 \text{ Hours} \times \$20/\text{Hour} \right) \right] = \$97,000$$

Q:
24 • Can't the benefits of Life Cycle Costing be gained more easily by upgrading requirements on equipment characteristics influencing logistics costs?

A:
24 • No. It is impossible to establish in advance that set of equipment characteristics which will result in the lowest Life Cycle Cost. Upgraded requirements frequently yield lower logistics costs, but usually also produce higher acquisition cost. Sometimes the net result is lower Life Cycle Cost, and sometimes it is not. Without the design details, purchase price, and support precepts, the result cannot be known.

In Case A of the example to the left, the higher-priced (Y Corporation) bid is the "best buy." Increasing the reliability (MTBF) and maintainability (MTTR) requirements to a minimum of 1.0 and a maximum of 3.0, respectively, would have made X Corporation non-responsive and thus produced the proper source selection decision. In Case B, however, increasing those requirements would have eliminated Z Corporation and hence precluded the possibility of making the "best buy."

Q: 25 • How can it be assured that predictions of logistics costs associated with a given design are accurate?

A: 25 • Absolute accuracy cannot be assured. It is not essential. The logistics costs considered are future costs and must therefore be calculated by predictive techniques. Prediction, by its very nature, has a degree of uncertainty.

If there is good reason to believe that the predictive methods employed will give the procuring agency a better chance of identifying the bidder whose equipment is of ultimate economic advantage to the Government than will consideration of acquisition cost alone, then use of the predictive methods is justified.

The confidence intervals in the illustration demonstrate the uncertainty inherent in logistics cost projections. While it is possible that the Life Cycle Cost of X Corporation's equipment will be lower than that of Y Corporation's equipment, the odds are clearly in favor of Y Corporation's equipment having an overall economic advantage. Use of the predicted logistics costs, despite their uncertainty, is preferable to the traditional practice of ignoring logistics costs because the absolute accuracy of their quantitative values cannot be assured in advance.

Costing Periods	UNDISCOUNTED COSTS			COSTS DISCOUNTED AT 10%		
	X Corp.	Y Corp.	Z Corp.	X Corp.	Y Corp.	Z Corp.
Prior To And Upon Delivery	\$67,000	\$101,000	\$72,000	\$67,000	\$101,000	\$72,000
First Year	35,800	30,200	26,200	32,471	27,392	23,764
Second Year	35,800	30,200	26,200	29,453	24,846	21,555
Third Year	35,800	30,200	26,200	26,715	22,536	19,551
Fourth Year	35,800	30,200	26,200	24,231	20,441	17,733
Fifth Year	35,800	30,200	26,200	21,978	18,540	16,085
TOTAL	\$246,000	\$252,000	\$203,000	\$201,848	\$214,755	\$170,688

Q: The April 1965 LMI report treats future expenditures in the same manner as current expenditures. Shouldn't estimated future expenditures be discounted to present value?

A: Ideally, future expenditures should be discounted. In order to keep Life Cycle Costing as simple as possible in the Test Program and because it has not been DoD practice to discount future costs, LMI did not include discounting in its 1965 report. In the Test Program, however, some Military Department personnel have decided to make Life Cycle Cost comparisons on a present value basis; and the Assistant Secretary of Defense (Comptroller) has endorsed the use of present value in evaluating investment decisions in his recent "Interim Operating Procedure No. 6--Economic Analysis of Proposed Defense Investments" (25 August 1966).

Cost comparison on a present value basis is the preferred method.

MAINTENANCE LABOR COST STANDARD DEPENDS ON:

- SKILL LEVELS REQUIRED
- HOURLY PAY RATE FOR THE VARIOUS SKILL LEVELS
- RATIO OF SUPERVISORY TIME TO MAINTENANCE TECHNICIAN TIME
- SUPERVISORY PAY RATES
- TRAINING REQUIRED FOR TECHNICIANS
- FACILITIES REQUIRED

INVENTORY MANAGEMENT COST STANDARD DEPENDS ON:

- RECORD-KEEPING AND REQUISITIONING PROCEDURES
- RECEIPT AND ISSUE PROCEDURES
- PAY RATES OF SUPPLY DEPARTMENT PERSONNEL, INCLUDING SUPERVISION
- SPACE REQUIRED PER ITEM
- CARE, PRESERVATION, AND PACKAGING REQUIREMENTS
- FACILITIES USED

INTRODUCTION OF NEW ITEMS COST STANDARD DEPENDS ON:

- LOCAL PROCEDURES FOR CATALOGING AND PREPARATION OF ITEM DESCRIPTIONS
- LOCAL PAY RATES OF SUPPLY DEPARTMENT PERSONNEL, INCLUDING SUPERVISION
- DEFENSE LOGISTICS SUPPORT CENTER PROCEDURES AND COSTS

Q 27: Should standard costs be developed for universal application throughout DoD in costing such activities as introduction of new spares and repair parts into the inventory, management of items in inventory, and maintenance labor at depots?

A 27: Some universal standards may be useful. They are not essential, however, and should be prescribed only after careful consideration. Differences in the logistics requirements of equipments and differences in local conditions and procedures can cause local standards to be more appropriate. Special cost factors have even been prescribed for individual procurements. Local or special cost factors are as permissible as DoD-wide factors, provided they are announced in the IFB or RFP.

DIRECT COMPARISON OF FIELD DATA IS INVALID

X CORPORATION MODEL

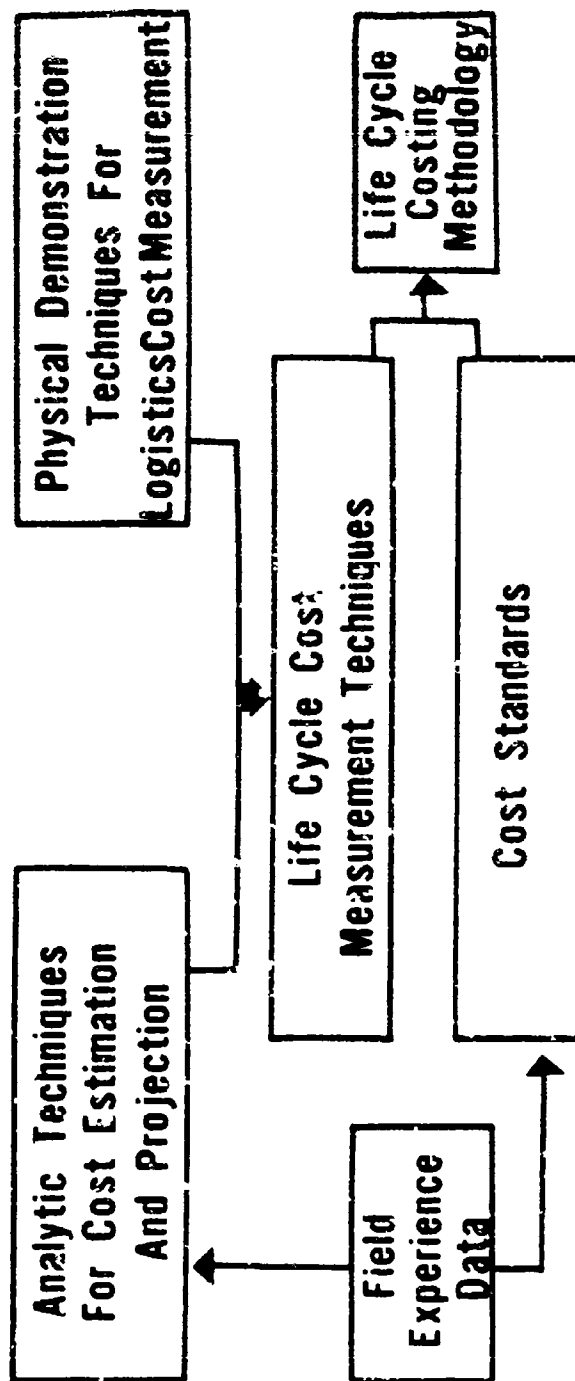
- Used In Alaska By The Army
- Used 8 Hours Per Day
- Repaired At The Depot Level
- Overhauled At Regular Intervals
- Piece Part Replacement Employed
- Every Maintenance Action Recorded As A Failure
- Average Equipment Age Is 4 Years

Y CORPORATION MODEL

- Used In West Germany By The Air Force
- Used 12 Hours Per Day
- Repaired In The Field
- Overhauled When Necessary
- Modular Replacement Employed
- Maintenance Actions Exceeding Two Hours Recorded As Failures
- Average Equipment Age Is 2 Years

Q: 28. Isn't field experience data, as collected in TAERS, the Navy 3M System, and the Air Force 66-1 System, the key to Life Cycle Costing awards which will stand up under protest?

A: 28. Field experience data can rarely be used in the Contract Award Decision Process. The requirement that all bids be evaluated on an equal basis rules out direct application of field data in almost all cases. Often field data are not available for some bidder's design. Even when they are available for all competing designs, validity of comparisons cannot be assured. There is always a substantial chance that a losing bidder can show that the data associated with his bid were collected under different and possibly less favorable circumstances than were those associated with the winning bid. Operating "load" may have been greater at certain times; maintenance procedures may have been less stringent; skill levels of operating and maintenance personnel may have been lower; operating environment may have been more difficult; specific equipment application may have been different; and even the data gathering and processing rules may have been nonuniform and hence may unfairly influence comparison results. Data used in bid evaluation should come from such sources as test results, analytical studies of design, or contractor claims which are subject to adequate post-delivery demonstration and penalty provisions.



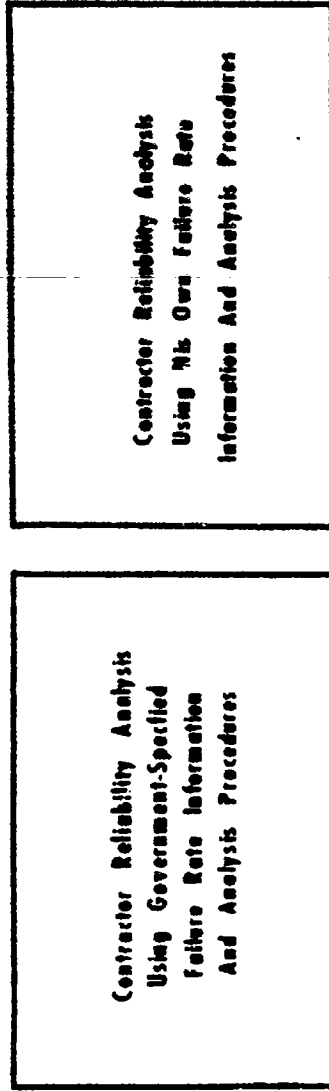
A 28, Continued:

It is usually impractical to use field data for post-delivery verification of contractor logistics cost claims. If operation or support conditions vary from those stated in the IFB or RFP, actual experience data are rendered invalid for verification purposes. In addition, the time required to obtain such data may be too long to permit their use for verification. Short-range demonstration procedures must usually suffice. The conditions under which those procedures are carried out must be specified in advance.

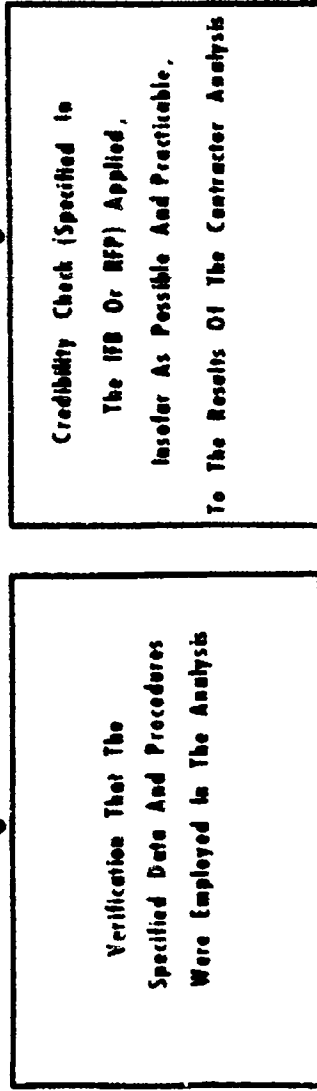
Field experience data can, however, be used to great advantage in the Procurement Method Decision. They can indicate which logistics costs are significant and likely to vary among bidders. They can also serve to improve overall Life Cycle Costing capability by providing a basis for development of cost standards and cost measurement techniques (as is illustrated to the left).

In the important maintenance cost category, the upgrading of estimating capability depends in major part on improvement of reliability and maintainability prediction techniques. Field experience data have played a key role in development of the predictive techniques which now exist. More extensive, refined, and accurate data should permit further advances.

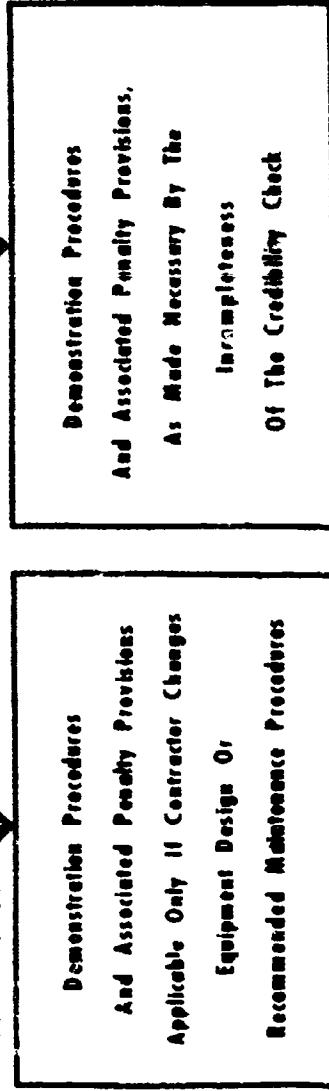
**BID (OR PROPOSAL)
PREPARATION:**



**BID (OR PROPOSAL)
EVALUATION:**



**CONTRACT STIPULATIONS
(IN ADDITION TO PROVISIONS
TO ASSURE ATTAINMENT OF
MINIMUM RELIABILITY
REQUIREMENTS):**



Q. 29 • Is it essential that the Government specify sources of failure rate information in the IPB or RFP? Can't bidders be allowed to draw upon their own sources of information in predicting equipment reliability?

A. 29 • It is not essential that the Government specify sources of failure rate information. Bidders can be allowed to use their own data, provided it is possible and practicable for the Government to verify the resultant logistics cost estimates with reasonable confidence. Ideally, it is not desirable to restrict a bidder to use of standard failure rates when his components may be of unusually high reliability. The relative simplicity of verification with Government-specified failure rates, however, sometimes makes that approach advisable in areas where extensive and detailed standard data are available (e.g., for random failure of electronic components and wearout of mechanical parts of specific materials). Additionally, Government-specified rates have the advantage of helping to make the advance statement of the logistics cost analysis procedure unmistakably clear.

When the Government specifies use of particular information, it asserts implicitly that the accuracy of the information is adequate for Life Cycle Costing purposes. Subsequent verification of the information for costing purposes is neither necessary nor appropriate. If the Government announces that it will accept results of specific contractor-conducted or -obtained tests, the same situation exists. In other cases the Government must assess the credibility of contractor-supplied data, insofar as practical, in evaluating bids, and must reserve the right to eliminate bidders whose data does not pass the credibility check. Post-delivery demonstration procedures and associated penalties are required to the extent that the credibility check cannot be made complete.

VALIDATION TECHNIQUES

● QUANTITATIVE ANALYSIS OF LOGISTICS IMPLICATIONS OF EQUIPMENT DESIGN

- Pre-Award
- Post Delivery

● PHYSICAL DEMONSTRATION

- Pre-Award
- Post Delivery

● SAMPLING

Q 30 :

How are bidders held to their claims? Aren't guarantees or warranties required?

A 30 :

A variety of techniques, and combinations of techniques, are employed to validate contractor logistics cost claims. The choice of techniques depends on the nature of the equipment, its intended application, the logistics costs to be estimated, the techniques available for analyzing those costs, and the resources which can be justified for the analysis. In any validation, bidders can be held responsible only for cost elements whose values are influenced by their designs. Government-provided cost standards are necessary for elements which are under the control of the Government. Conditions under which contractor compliance with cost claims will be established must be stated in advance.

Sometimes pre-award validation is possible by making physical tests of models, pre-production samples, or off-the-shelf items. Sometimes (e.g., for many electronic products) pre-award validation can be accomplished by means of quantitative analyses of design characteristics. In both situations, additional validation for cost purposes is unnecessary so long as the design is not altered. Quality of manufacture is assured by the usual Government quality assurance procedures.

In instances where pre-award validation is not possible or practical, but post-delivery analysis and/or demonstration under controlled conditions can be accomplished, contractor logistics cost claims are accepted for the purpose of contract award. The claims are then included in the contract, along with the validation procedures and associated penalty provisions. Guarantee or warranty of actual field costs are not made necessary by the use of Life Cycle Costing.

Sampling techniques are a normal part of demonstration procedures.

LIFE CYCLE COSTING IN SYSTEM ACQUISITION

1. Request for Proposals for Contract Definition
 - Scope of Intended Life Cycle Cost analysis
 - Role of Life Cycle Cost in award of the Development Contract or Total Package Contract
 - Requirement for proposed Life Cycle Cost Element Structure
2. Contract Definition Contracts
 - Life Cycle Cost Element Structure, complete with definitions
 - Government cost standards for use by contractors
 - General format for presentation of results of Life Cycle Cost analysis
 - General procedure for Government evaluation of Life Cycle Cost estimates
 - Nature of cost measurement techniques and penalty provisions anticipated for the Development Contract or Total Package Contract
3. Evaluation of Contract Definition Efforts
 - Credibility check of Life Cycle Cost estimates
 - Comparison of Life Cycle estimates
 - Relation of Life Cycle Cost estimates to system performance characteristics
4. Development Contract or Total Package Contract
 - Life Cycle Cost claims
 - Cost measurement techniques (including demonstration procedures)
 - Penalty provisions for deviation from cost claims
5. Life Cycle Cost Measurement and Application of Penalties

Q 31. Can Life Cycle Costing be applied to major system acquisitions?

A 31. Yes. The 1965 report was restricted to procurements of assemblies, subassemblies, parts, and minor subsystems because it was believed advisable to gain experience at that equipment level before attempting to use Life Cycle Costing in system acquisitions. Work has recently been undertaken at the system level. In the Navy Fast Deployment Logistics (FDL) Ship System procurement, for example, Life Cycle Cost is the economic award criterion. With the advent of Contract Definition and Total Package Procurement, the use of competition in major system acquisitions is increasing. Life Cycle Costing is expected to play an important role.

In equipment and systems procurements alike, the same Life Cycle Costing conditions must be satisfied (ability to predict logistics costs with reasonable confidence, ability to verify bidders' claims, explicit advance statement of award criteria, and economic feasibility of analysis procedures). Specific techniques employed in equipment procurements, however, may not be appropriate for system procurements. Detailed design information is seldom, if ever, available before a major system contract is let, and in such a contract penalty provisions for deviations from cost claims can rarely be expected to fully compensate the Government.

A list of steps which might be followed in the application of Life Cycle Costing to a major system acquisition is given to the left. Much additional study is required, however, before a firm methodology for system Life Cycle Costing can be established.

INTEGRATED LOGISTIC SUPPORT

IMPLEMENTING INSTRUCTIONS - U. S. NAVY

SECNAV INSTRUCTION 4000.29

- "enlarges the scope of the integrated logistic support concept . . . to require application of the principles involved to all acquisitions of systems and equipments"
- charges the Chief of Naval Material with responsibility to:
 - "develop and prescribe procedures for the prediction of logistic support costs"
 - "develop and prescribe procedures for optimizing logistic support costs through analysis of potential trade-offs between reliability, maintainability, and alternative support methods"

NAVMAT INSTRUCTION 4000.20

- "Inherent to an understanding of this process is acceptance of the concept that the cost and adequacy of logistic support is a matter equal in importance to the cost and adequacy of the end item itself."

In Concept Formulation and Contract Definition, or in Advance Procurement Planning, requires "logistic cost estimates for each alternative expressed in terms of a) initial investment, b) annual costs, c) life cycle costs" and "definition of the financial plan and estimate of logistic costs . . ."

- In Development of Production, requires "documentation and supporting data for all logistic cost estimation including initial investment, annual operating costs and a life cycle cost."

Q 32. Is Life Cycle Costing compatible with Integrated Logistic Support?

A 32. Yes. In fact, the Integrated Logistic Support Directive and Instructions make it mandatory that much of the effort required for Life Cycle Costing be carried out. DoD Directive 4100.35 states that: "Integrated logistic support development programs shall employ techniques for predicting system or equipment quantitative and qualitative support requirements and associated annual support costs in resources and funds during the operational phase."

It also requires, except when Contract Definition "Total System Trade-Offs" achieve the same result, that "the factors listed below shall be evaluated with respect to logistic support requirements . . . : a) Complexity of the system or equipment; b) Quantity of systems or equipments to be procured; c) Intended use of the system or equipment (Experimental or Operational); d) Procurement cost; e) Anticipated life cycle; f) Estimated annual support costs including logistic personnel requirements."

Integrated Logistic Support instructions are consistent with the Life Cycle Cost concept and require that most of the logistics cost analysis effort be performed whether or not a Life Cycle Cost procurement is anticipated. Consequently, little additional effort is required to carry out the procurement on a Life Cycle Cost basis.

"...I do not acknowledge that any significant additional administrative leadtime would be necessary to implement life cycle costing techniques. However, even if additional time were required, I believe it would be minimal,...and because of the great savings potential it would be worth it."

J.L. Howard, Captain.U.S.Navy (17 March 1966)

"Our experience is that the additional effort required to incorporate Life Cycle Cost factors in procurements is minor as compared to the benefits that result.

In addition, the factors once developed for a particular commodity, have continual application on repeat procurements. The benefits encompass the complete spectrum from decreased operating and support costs to increased military effectiveness.

.....
The wide range of functionally similar but structurally different equipments being installed on our ships was a rapidly snowballing problem of grave and increasing concern to both the Naval Ship Systems Command and the Fleet. Utilizing the considerations set forth in "Life Cycle Costing in Equipment Procurement", my staff developed "cost factors" which result from non-standardization. The factors are being used directly in Government procurements....

.....
Another major benefit from the use of "Life Cycle Cost" factors results from the change in emphasis in procurements from "Price" to "Performance". Purchase specifications establish minimum requirements. Use of the factors allows the obtaining of improved performance whenever overall benefit to the Government will result."

A. Bodnaruk, Captain. U.S. Navy (9 Dec. 1966)

Q: 33. When Life Cycle Costing is widely employed, will more resources (including time) be required by the Government to structure the IFBs and RFPs and will more time be required for bidders to respond?

A: 33. Test experience to date is not conclusive regarding added time and cost of Life Cycle Cost procurements. Some Life Cycle Cost procurements have taken no additional time prior to IFB or RFP release. Others have required as much as five weeks extra. Those figures must be interpreted, however, with caution. Some test cases were chosen for their simplicity and therefore proceeded without complication or delay. Others involved delays to orient personnel to the Life Cycle Costing approach and therefore consumed more time and effort than should be required in the future. All test cases involved additional work by technical personnel. In general, bidders have not been given more time to respond; nor have they asked for it.

Although test experience to date is not extensive, many personnel are convinced that any added time and effort required by Life Cycle Costing will more than pay off in improved equipment performance and overall cost reduction.

PROCUREMENT OF NONREPARABLE EQUIPMENT

ESTABLISHMENT OF ECONOMIC AWARD CRITERION

ACQ. COST = ACQUISITION COST

R&R COST = REMOVE AND REPLACE COST
(EXCLUDING THE ACQUISITION
COST OF THE REPLACEMENT ITEM)

IS SERVICE LIFE LIKELY TO VARY
SIGNIFICANTLY AMONG THE
VARIOUS BIDDERS' PRODUCTS?

YES NO

IS SERVICE LIFE ABOVE THE MINIMUM
ACCEPTABLE OF VALUE TO
THE GOVERNMENT?

YES NO

IS R&R COST LIKELY TO BE
SIGNIFICANT?

YES NO

IS R&R COST LIKELY TO VARY
SIGNIFICANTLY AMONG THE
VARIOUS BIDDERS' PRODUCTS?

YES NO

THEN ECONOMIC AWARD CRITERION IS:

$$\frac{\text{ACQ. COST} + \text{R\&R COST}}{\text{SERVICE LIFE}}$$

$$\frac{\text{ACQ. COST}}{\text{SERVICE LIFE}}$$

$$\text{ACQ. COST} + \text{R\&R COST}$$

ACQ. COST

Q 34: Where does the most rapid payoff seem to lie in implementation of Life Cycle Costing?

A 34: Nonreparable items offer the most rapid and easy payoff. If competition is technically feasible for a nonreparable item, time delays and costs for qualification of new bidders or products are usually the only factors which could make a sole source procurement advisable. If competition is to be secured, the appropriate economic award criterion can be established by following the steps in the Flow Chart to the left.

If it is determined that cost per unit of service life is the appropriate economic award criterion, then both minimum acceptable service life and maximum useful service life should be specified in the IFB or RFP. Credit should not be given to a bidder for service life in excess of the maximum useful.

While procurement of nonreparables offers the most rapid payoff in Life Cycle Costing, it does not offer the largest payoff. The greatest potential benefit pertains to the maintenance cost category. Primary attention should, therefore, be given to consideration of maintenance cost in the procurement of reparable items.

EXAMPLES OF TEST PROCUREMENTS

LIST OF EXHIBITS

I. 600 HORSEPOWER NON-MAGNETIC DIESEL ENGINES

II. TUNABLE MASTER OSCILLATOR KLYSTRON

III. SIX VOLT STORAGE BATTERY

IV. 30 KVA ELECTRICAL GENERATING SYSTEM

V. FILM RESISTORS

VI. CONSTANT SPEED DRIVE ASSEMBLY

VII. ALARM DOSIMETER

VIII. LIFE CYCLE COST EXPERIENCE REPORT FORMAT

Q³⁵:

How does the Life Cycle Costing concept work in actual practice?

A:

A³⁵: Assessment of the practicability of Life Cycle Costing is the key objective of the DoD Test Program. While more than fifty procurements have been completed, much more test experience must be gained before results can be regarded as conclusive. Most types of equipment still have not been purchased on a Life Cycle Cost basis. Most procuring agencies still have not participated in the Program.

In test procurements of nonreparable items, service life differences have often caused contract award to go to other than the low price bidder. In test procurements of repairables, however, logistics cost additives have not influenced the award decision. That circumstance does not reflect insignificance of logistics costs, but rather the fact that only a small portion of logistics costs have been used as award criteria thus far. Test Program plans call for expanding the logistics cost coverage of award criteria.

I. 600 HORSEPOWER NON-MAGNETIC DIESEL ENGINES

(for mine warfare ships)

A. Method of Procurement

Formal Advertising

Multi-Year

B. Evaluation Criteria

Unit purchase price

Cost of repair parts for a ten-year period

Fuel consumption cost penalty (obtained by multiplying \$100,000 by the amount by which fuel consumption exceeded 0.380 pounds/brake horsepower/hour)

C. Validation Procedure

Each competing company was required to include in its bid a repair parts schedule and a fixed price option for repair parts.

The IFB and the contract specified, in detail, fuel consumption tests to be performed on five percent of the engines delivered. The contractor was allowed to exceed his bid average specific fuel consumption (ASFC) by 0.010 pounds/brake horsepower/hour without reduction in price. The contract required, however, reduction in total purchase price for fuel consumption exceeding bid ASFC by a larger margin. That reduction is given by the following formula:

(Test ASFC - Bid ASFC - 0.010) x \$100,000 x Number of Engines Delivered.

D. Award

The contract was awarded to the bidder whose purchase price was lowest. Evaluation results, on a unit engine basis, are as follows:

<u>Company</u>	<u>Purchase Price</u>	<u>10-Year Repair Parts</u>	<u>Fuel Consumption Penalty</u>	<u>Total</u>
W	\$ 19,614	\$ 6,132.87	\$ 0	\$ 25,746.87
X	27,200	Not Stated	3,334.67	?
Y	31,900	3,694.77	0	35,594.77
Z	63,374	18,318.41	2,633.33	84,325.74

Company X was non-responsive.

II. TUNABLE MASTER OSCILLATOR KLYSTRON

(for the Hawk missile system)

A. Method of Procurement

Competitive Negotiation

Authority to Negotiate granted on the basis of ASPR 3-210.2 (xiii):
"when it is impossible to draft . . . adequate specifications or any other adequately detailed description of the required supplies or services"

B. Evaluation Criteria

P = unit purchase price

S = one tube's share of the cost of special tooling

L = average hours of tube life

T = temperature coefficient

N_{am} = AM noise

N_{fm} = FM noise

P_{se} = spurious emission amplitude

F_s = frequency stability input voltage

The RFP stated that the contract award would be made to the competitor whose proposal was lower, based on the following formula:

$$\frac{P + S}{L} - T - N_{am} - N_{fm} - P_{se} - F_s$$

Specific performance levels for T, Nam, Nfm, Fse, and Fs were given as 0-levels. Performance different from those levels resulted in positive or negative values for the variables. Maximum and minimum values were stipulated. Rules for measuring performance levels were explicitly stated.

C. Validation Procedure

Prior to award, the Government purchased eighteen tubes from each potential supplier. Those tubes were tested to establish the values for L, T, Nam, Nfm, Fse, and Fs.

D. Award

The most influential factor was Average Hours of Tube Life. Award went to the competitor with the higher purchase price.

Evaluation results were as follows:

Company	P	\$	L	T	Nam	Nfm	Fse	Fs	Evaluation Result
X	\$ 1250	\$ 19	546 hrs.	0	-.19	-.03	0	.475	2.0325
Y	1239	0	973 hrs.	0	-.19	.01	0	.469	0.9844

III. SIX VOLT STORAGE BATTERY

A. Method of Procurement

Formal Advertising

Small Business Setaside

B. Evaluation Criteria

P = unit purchase price

C = number of charge-discharge cycles guaranteed per battery

The IFB stated that the contract award would be made to the company whose bid was lowest, based on the ratio, P/C.

C. Validation Procedure

It was specified in the IFB and in the contract that samples selected from the production line would be tested by the Government. Failure to equal or exceed the guaranteed number of cycles is cause for an adjustment by the contractor. Adjustment can be made in either of two ways:

1) Delivery of additional batteries, the number of which is determined by the following formula, with the resultant value rounded to the nearest whole number:

$$\text{purchase quantity} \times \left(\frac{\text{cycles per battery} - \text{average cycles per battery}}{\text{guaranteed} - \text{from test}} \right)$$

average cycles per battery from test

2) Cash refund, the amount of which is determined by the following formula:

$$\frac{\text{total purchase price} \times \left(\frac{\text{cycles per battery guaranteed} - \text{average cycles per battery from test}}{\text{cycles per battery guaranteed}} \right)}{\text{cycles per battery guaranteed}}$$

D. Award

The low bidder on a price per cycle basis was the company with the highest number of cycles guaranteed and the third lowest unit purchase price. Since that company qualified as a small business, its contract covered the entire purchase quantity. Evaluation results were as follows:

Company	Unit Purchase Price	Guaranteed Number of Cycles	Price per Cycle
W	\$ 28.99	250	\$ 0.11596
X	29.42	250	0.11768
Y	31.55	400	0.07888
Z	32.77	250	0.13108

IV. 30 KVA ELECTRICAL GENERATING SYSTEM

(for F-4 aircraft)

A. Method of Procurement

Two-step formal advertising
Multi-year

B. Evaluation Criteria

Total purchase price

Cost of transportation to the first destination

Labor cost of overhauls during the first five years (at \$4.55 per man hour)

Quoted price of one unit of each spare, repair part, or item of support equipment

Cost of initially introducing spares, repair parts, and support equipment into the inventory (\$250 per item)

Cost of managing spares and repair parts in the inventory for a period of five years (\$500 per item)

C. Validation Criteria

Each bidder's technical proposal (Step One) was required to include the results and supporting data from reliability and maintainability analyses, conducted in accordance with Government-specified guidelines

and handbooks. Maintenance manhours, parts consumption, and support equipment figures produced by the analyses were used in Step Two to calculate the logistics costs which served as bid evaluation factors.

Government personnel reviewed the Step One reliability and maintainability analyses, compared the results with data from physical tests of the bidders' sample systems, and obtained revised submissions, where necessary.

D. Award

Logistics cost additives were not large enough to influence the award decision. Evaluation results are as follows:

Company	Total Purchase Price		Other Factors		Total
X	\$ 4,100,418.50		\$ 53,819.34		\$ 4,154,237.84
Y	4,869,717.00		99,550.82		4,969,267.82

V. FILM RESISTORS

A. Method of Procurement

Competitive negotiation

Authority to negotiate granted under 10 USC 2304(a)(2): "the public exigency will not permit the delay incident to advertising"

B. Evaluation Criteria

P = unit purchase price

L = hours of service life per resistor

The RFP stated that award would be made to the offeror whose proposal represented the lowest quotient obtained by dividing P by L. The minimum acceptable value of L was 1000 hours. The maximum value allowed for evaluation purposes was 1500 hours.

C. Validation Procedure

Offerors were required to submit, with their proposals, descriptive material (e.g., cuts, illustrations, drawings) and test data sufficient for verification of claimed service life. The RFP clearly stated that any proposal failing to include sufficient data could be considered non-responsive. Offerors were also required to propose service life test procedures to be used by the Government for the purpose of inspection and acceptance.

D. Award

Six different but similar film resistors were covered by the RFP.
Proposals were as follows:

<u>Company</u>	<u>Claimed Service Life</u>	<u>Unit Purchase Price</u>					
		<u>Item 1</u>	<u>Item 2</u>	<u>Item 3</u>	<u>Item 4</u>	<u>Item 5</u>	<u>Item 6</u>
W	1000 hrs.	\$ 2.28	\$ 3.99	\$ 5.76	\$20.40	\$7.60	\$ 4.00
X	1000 hrs.	3.99	3.99	12.39	18.87	7.79	4.51
Y	1500 hrs.	4.37	-	11.04	20.91	7.79	4.51
Z	Not stated	-	-	-	15.30	5.89	3.10

A contract for Items 1, 2, and 3 was awarded to Company W. A contract for items 4, 5, and 6 was awarded to Company Y.

VI. CONSTANT SPEED DRIVE ASSEMBLY

(for aircraft)

A. Method of Procurement

Two-step formal advertising

Multi-year

B. Evaluation Criteria

Total purchase price

\$33.98 for each part initially introduced into the inventory

\$34.75 for each subassembly initially introduced into the inventory

\$51.72 for each assembly initially introduced into the inventory

Manpower cost of provisioning spares support from a new source (\$640.00)

Cost of developing depot labor standards for spare items initially introduced into the inventory (\$6.50 per part, \$19.50 per subassembly or assembly)

Cost of developing depot materiel standards for spare items initially introduced into the inventory (\$19.50 per item)

Cost of new aerospace ground equipment (AGE) required

C. Validation Procedure

A bidder who had not previously supplied his Drive Assembly to the Government was required to submit a detailed parts list, recommendations for spare items, drawings, sketches, specifications, technical descriptions, and a detailed list of peculiar AGE. That information was required in Government-specified formats (some of it on punched cards) to facilitate Government review in Step One of the procurement.

A bidder who had previously supplied his Drive Assembly was not required to submit detailed design and parts information, provided that he presented certification that the same Drive Assembly would again be furnished.

D. Award

Bidder X was a previous supplier, and so had no logistics costs added to his price for bid evaluation purposes. Bidder Y incurred logistics cost additives of \$14,519.09, but his total purchase price was \$188,233.00 lower than that of X. The contract was therefore awarded to Y.

VII. ALARM DOSIMETER

A. Method of Procurement

Formal Advertising

B. Evaluation Criteria

Total purchase price

\$6500 for conducting first article tests (applicable to each bidder whose dosimeter required such testing)

\$1000 for each new part introduced into the supply system

C. Validation Procedure

The IFB stated the names of companies whose dosimeters would not require first article testing.

The IFB included, as an enclosure, an Allowance Parts List (APL). Each bidder was required to submit a list of all non-APL parts which would be in his dosimeter.

The IFB and the contract stated that if the contractor used non-APL parts in excess of, or less than, the number set forth in the list submitted with his bid, total contract price would be decreased or increased, respectively, by \$1000 times the difference between the number on the list and the number in the delivered item.

D. Award

A previous supplier offered a dosimeter which contained only APL parts and did not require first article testing. In addition, he was the low price bidder. He was awarded the contract.

VIII. LIFE CYCLE COST EXPERIENCE REPORT FORMAT

(recommended by the DoD Steering Group)

DEPARTMENT:
ACTIVITY:
DATE:

1. Generic description and model number of equipment.
2. Application; i.e., single or multiple, and system or systems in which the equipment is used.
3. Equipment history. For example, was the equipment previously purchased under the same military specification; is the test procurement for a modified version of an equipment previously purchased? What contract provisions control the equipment design; i.e., specifications or drawings or a Government-furnished model? Is the test procurement for a commercial equipment; is the equipment a QPL item; is the equipment repairable or non-reparable?
4. Test procurement identification. Use RFP or IFB number and contract number if assigned. Use only RFP or IFB number when analysis resulted in a procurement without life cycle costing.
5. Procurement history. Were production quantities previously purchased? If no production quantities were previously purchased, explain circumstances of previous procurements. Have previous procurements normally resulted in more than one proposal or bid? Include brief statement of last procurement; e.g., negotiated competitive with three proposals resulting in a firm fixed price contract awarded to XYZ company.

6. What significant logistics costs are normally associated with the equipment?
7. What logistics costs were included in the test procurement?
8. Explain why significant logistics costs referred to in No. 6 above, if any, were not included in the test procurement. If no logistics costs were included in the test procurement, was the procurement sole source or price competitive?
9. What organizational elements participated in planning the procurement?

For procurements using Life Cycle Costing, also furnish the following information:

10. Brief description of test procurement. For example, whether formally advertised or negotiated; number of firms solicited and proposals or bids received; to whom awarded.
11. Brief statement of the influence of logistics costs on the award; i.e., would the successful bidder have obtained the award without logistics costs consideration; if not, which logistics cost most significantly influenced the award decision?
12. What was the logistics costs analysis impact, if any, on procurement lead time and proposal or bid evaluation time and effort?
13. What significant questions and/or objections were raised by bidders? In the event of a protest, explain disposition. In the event of a GAO decision, attach copy.
14. General comments and analysis of advantages and disadvantages of life cycle costing in the test procurement.
15. Attach copies of life cycle costing provisions included in RFP or IFB, a copy of the resultant contract and, if practicable, a copy of each proposal or bid.

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13. ABSTRACT <p>✓ The report summarizes progress of the DoD Life Cycle Costing Test Program since its establishment in July 1965. That program, a collective effort of the Office of the Secretary of Defense, the military departments, and defense industry, is assessing the practicability of making contract awards on the basis of estimated future logistics costs as well as purchase price. The thirty-five questions most frequently asked during the test program are presented and answered. Seven test procurements are described.</p>		

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